Vol. 8, No. 14
July 31, 1983

Energy Research Abstracts

Abstracts 32941-34979

Technical Information Center
UNITED STATES DEPARTMENT OF ENERGY

CURRENT AWARENESS PUBLICATIONS ON ENERGY

To provide complete coverage of literature related to major Department programs, announcement publications that are comprehensive in their coverage of certain energy fields are issued regularly. All information in these publications, plus additional backup information, is included in the Energy Data Base of the Technical Information Center; all references are also available for machine searching via the on-line retrieval system, DOE/RECON, and the commercial on-line retrieval systems. Descriptions of these current awareness publications, which are supported either directly or indirectly by the DOE, appear below. Department of Energy components may receive the listed publications free from the Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. Telephone (615) 576-1303; (FTS) 626-1303.

PUBLICATIONS OF THE TECHNICAL INFORMATION CENTER

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize the following: programmatic efforts; legislative, regulatory, and other legal aspects; social, economic, and environmental impacts; regional and sectoral analyses; institutional factors, etc. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402; domestic subscribers $6.00, foreign $7.50 per copy; annual cumulative index, domestic $10.00, foreign $12.50 per copy. The annual subscription price is $70.00 for domestic subscribers and $87.50 for foreign subscribers.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign).

The following publications are available to the public on a subscription basis from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual subscription rate for one volume (calendar) year (12 issues plus cumulative index) is $75.00 for domestic subscribers and $150.00 for subscribers outside the North American continent, except as listed below for *DOE Patents Available for Licensing (PAL).* A single issue is $7.00 (domestic) and $14.00 (outside the North American continent).

Current Energy Patents (CEP)

A monthly publication providing abstracting and indexing coverage of the international patent literature, including patent applications, that concerns any aspect of energy production, conservation, and utilization. Available as PB83-902800.

DOE Patents Available for Licensing (PAL)

DOE is prepared to grant exclusive or nonexclusive, revocable licenses under DOE-owned U. S. patents and patent applications; this semiannual publication provides abstracting and indexing coverage to this literature. Available as PB83-946800; the annual subscription price is $14.00 (domestic) and $28.00 (foreign).

Energy and the Environment (EAE)

A monthly abstract journal devoted to information on the impacts of energy-related activities and radioactive and nonradioactive pollutants on the environment. Available as PB83-914900.

Fossil Energy Update (FEU)

A monthly abstract journal devoted to information on the processing and use of fossil fuels. Available as PB83-914600.

Fusion Energy Update (CFU)

A monthly abstract journal devoted to information on controlled thermonuclear research. Available as PB83-915300.

Solar Energy Update (SEU)

A monthly abstract journal devoted to information on the utilization of solar energy, including biomass and tidal and wind power. Available as PB83-914500.

The following publications are available from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual rate for one volume (calendar) year (24 issues) is $40.00 for domestic subscribers and $80.00 for subscribers outside the North American continent.

Direct Energy Conversion (DEC)

A semimonthly current awareness bulletin covering the following areas: photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells. Available as PB83-946600.

Geothermal Energy Technology (GET)

A semimonthly current awareness bulletin devoted to information on the exploration and development of geothermal resources. Available as PB83-914700.

Nuclear Fuel Cycle (NFC)

A semimonthly current awareness bulletin covering all aspects of the nuclear fuel cycle, both front end and back end. Available as PB83-913400.

Nuclear Reactor Safety (NRS)

A semimonthly current awareness bulletin covering the following safety aspects: accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures. Available as PB83-913500.

Radioactive Waste Management (RWM)

A semimonthly current awareness bulletin covering the following management aspects: transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers. Available as PB83-902900.

INTERNATIONAL ENERGY PUBLICATIONS

The Technical Information Center cooperates with the following organizations in the publication of international abstract journals: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts;* and (3) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts.* In each case, the cognizant foreign agency provides the non-U.S. information to TIC for inclusion in the Energy Data Base; in turn, TIC provides the U.S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from UNIPUB, 345 Park Avenue South, New York, NY 10010. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $290.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information in any step involved in the eventual conversion of biomass to energy. *Biomass Abstracts* is available free to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 42 IR pounds per year. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 100 pounds sterling per year.

International Copyright, © U. S. Department of Energy, 1983, under the provisions of the Universal Copyright Convention. United States copyright is not asserted under the United States Copyright Law, Title 17, United States Code.

energinfo ERA

Vol. 8, No. 14
ISSN: 0160-3604
CODEN: ERABD
July 31, 1983

ENERGY RESEARCH ABSTRACTS

ABOUT THE TECHNICAL INFORMATION CENTER

The Technical Information Center in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, the Center places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Whereas the literature of science is emphasized, coverage is extended to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish this mission, the Center builds and maintains computerized energy-information data bases and disseminates this information via computerized retrieval systems and announcement publications such as abstracting journals, bibliographies, and update journals. Direct access to the Center's most comprehensive data base, the Energy Data Base, is available to the public through commercial on-line bibliographic retrieval systems. The Energy Data Base and many of the Center's energy-related data bases are available to DOE offices and contractors and to other government agencies via DOE/RECON, the Department's on-line information retrieval system. The Center has developed and maintains systems to record and communicate energy-related research-in-progress information, to maintain a register of DOE public communications publications, to track research report deliverables from DOE contractors, and to test and make available DOE-funded computer software programs with scientific and management applications. The Center also maintains a full-scale publishing capability to serve special publication needs of the Department. To effectively manage DOE's technical information resources, the Center's program is one of continual development and evaluation of new information products, systems, and technologies.

UNITED STATES DEPARTMENT OF ENERGY

Donald Paul Hodel
Secretary

Martha O. Hesse
Assistant Secretary
Management and Administration

William S. Heffelfinger
Director of Administration

Joseph G. Coyne
Manager
Technical Information Center

ABOUT *ENERGY RESEARCH ABSTRACTS*

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

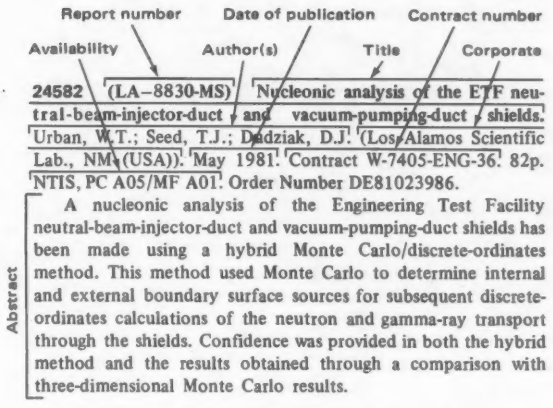
ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, and in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, Virginia 22161, and from Engineered Systems, P. O. Box 866, Oak Ridge, Tennessee 37830.

Published by the **United States Department of Energy, Technical Information Center**
P. O. Box 62, Oak Ridge, Tennessee 37830

HOW TO USE *ENERGY RESEARCH ABSTRACTS*

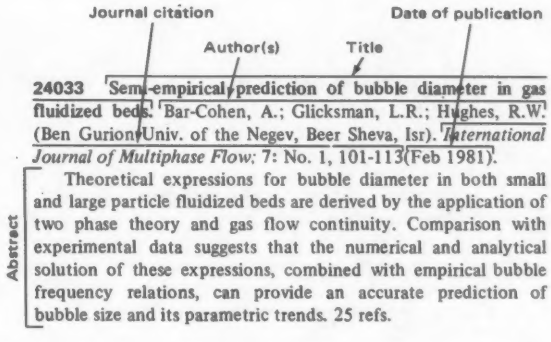
ABSTRACTS IN *ENERGY RESEARCH ABSTRACTS*

The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.



24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. (Los Alamos Scientific Lab., NM (USA)). May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.

A nucleonic analysis of the Engineering Test Facility neutral-beam-injector-duct and vacuum-pumping-duct shields has been made using a hybrid Monte Carlo/discrete-ordinates method. This method used Monte Carlo to determine internal and external boundary surface sources for subsequent discrete-ordinates calculations of the neutron and gamma-ray transport through the shields. Confidence was provided in both the hybrid method and the results obtained through a comparison with three-dimensional Monte Carlo results.



24033 Semi-empirical prediction of bubble diameter in gas fluidized beds. Bar-Cohen, A.; Glicksman, L.R.; Hughes, R.W. (Ben Gurion Univ. of the Negev, Beer Sheva, Isr.). *International Journal of Multiphase Flow*; 7: No. 1, 101-113 (Feb 1981).

Theoretical expressions for bubble diameter in both small and large particle fluidized beds are derived by the application of two phase theory and gas flow continuity. Comparison with experimental data suggests that the numerical and analytical solution of these expressions, combined with empirical bubble frequency relations, can provide an accurate prediction of bubble size and its parametric trends. 25 refs.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA)*. Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. **(Los Alamos Scientific Lab., NM (USA)).** May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.

is indexed as:

Los Alamos Scientific Lab., NM (USA)
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Bar-Cohen, A., Semi-empirical prediction of bubble diameter in gas fluidized beds, 7:24033 (J:US)
Dudziak, D.J., *See* Urban, W.T., 6:24582
Glicksman, L.R., *See* Bar-Cohen, A., 7:24033
Hughes, R.W., *See* Bar-Cohen, A., 7:24033
Seed, T.J., *See* Urban, W.T., 6:24582
Urban, W.T., Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

TOKAMAK ETF
Neutral Atom Beam Injection
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)
Neutron Transport
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Contract Number Index

DOE technical literature is indexed using contract numbers under which the literature was produced. This index contains the contract number with corresponding abstract and report numbers.

W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	6:24582	LA–8830-MS

• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under an Order Number, that number is included in the availability statement. An Order Number–Report Number Correlation is included for convenience.

LA–		
8830-MS	6:24582	NTIS, PC A05/MF A01. Order Number DE81023986, Distribution Category STD-20d

STAFF OF ENERGY RESEARCH ABSTRACTS

Editor
David E. Bost

Assistant Editors
Lee M. Thompson
Charles E. Stuber

Associate Editors for Fossil Energy
M. Catherine Grissom
D. Lamar Cason
Dorothy M. Chertok
Lynda H. Kern
Betty L. McDowell
Lorne T. Newman
Donna G. Powers
Amy T. Tamura

Associate Editors for Physical Sciences and Engineering
Robert C. Kelly
Jack Blanshei
Lisbeth C. Lieberman
W. Hugh Kinser
George H. Thoeming

Associate Editors for Environmental, Biomedical, and Life Sciences
Sidney F. Lanier
E. Ray Bedford
Polly S. Blackburn
Jane G. Buchanan
Robert J. Chertok
Kathleen R. Meyer
Axel C. Ringe
David L. Snow

Associate Editors for Nuclear Energy
Henry D. Raleigh
David C. Cunningham
James R. Dulaney
Lawrence T. Whitehead
Milton O. Whitson

Associate Editors for Conservation and Solar Energy
Lila B. Smith
Dona C. Keller
Mona H. Raridon
Jerry M. Thomas
Martha C. Wilson
Larry E. Williams

Subject Heading Specialist
Julia S. Redford

Corporate Author Specialist
Patsy L. Hendricks

Report Number Specialist
Wanda Parks

Contract Number Specialist
William D. Matheny

Cataloging and Digitizing Coordinator
J. Paul Meredith

Computer Processing Coordinator
Billy H. Brady

Publishing Coordinator
Irene D. Keller

Communication concerning the editorial policy and content of *Energy Research Abstracts* should be addressed to the Editor, *Energy Research Abstracts*, Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

01 COAL AND COAL PRODUCTS
- 04 Processing
- 05 By-Products
- 06 Properties
- 08 Waste Management
- 09 Environmental Aspects
- 10 Reserves and Exploration
- 20 Mining
- 30 Transport and Handling
- 40 Combustion
- 50 Marketing and Economics
- 60 Health and Safety
- 70 Regulations

02 PETROLEUM
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling and Production
- 04 Processing
- 05 Products and By-Products
- 06 Health and Safety
- 07 Marketing and Economics
- 08 Waste Management
- 09 Environmental Aspects
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Storage
- 50 Combustion

03 NATURAL GAS
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling, Production, and Processing
- 04 Products and By-Products
- 05 Health and Safety
- 06 Marketing and Economics
- 07 Waste Management
- 08 Environmental Effects
- 09 Artificial Stimulation, Plowshare, etc.
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Combustion
- 50 Storage

04 OIL SHALES AND TAR SANDS
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 03 Drilling, Fracturing, and Mining
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 06 Direct Uses and By-Products
- 07 Health and Safety
- 08 Marketing and Economics
- 09 Waste Research and Management
- 10 Environmental Aspects
- 20 Regulations

05 NUCLEAR FUELS
- 01 Reserves
- 02 Exploration
- 03 Mining
- 04 Feed Processing
- 05 Enrichment
- 06 By-Products
- 07 Fuels Production and Properties
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 10 Marketing and Economics
- 20 Waste Management
- 30 Environmental Aspects
- 40 Health and Safety
- 50 Regulations

06 FUSION FUELS
- 01 Sources
- 02 Processing
- 03 By-Products
- 04 Transport and Storage
- 05 Health and Safety
- 06 Regulations and Policy
- 07 Waste Management
- 08 Properties
- 09 Environmental Aspects

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 01 Physical Isotope Separation
- 02 Radiation Sources
- 03 Isotopic Power Supplies

08 HYDROGEN
- 01 Production
- 02 Storage
- 03 Transport
- 04 Marketing and Economics
- 05 Safety
- 06 Industrial and Commercial Use
- 07 By-Products
- 08 Properties
- 09 Environmental Aspects

09 OTHER SYNTHETIC AND NATURAL FUELS
- 01 Hydrocarbon Fuels
- 02 Alcohol Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 04 Solid Waste Fuels
- 05 Liquid Waste Fuels
- 06 Gaseous Waste Fuels

13 HYDRO ENERGY
- 01 Resources and Availability
- 02 Site Geology and Meteorology
- 03 Plant Design and Operation
- 04 Regulations and Licensing
- 05 Economics and Management
- 06 Environmental Aspects
- 07 Power Conversion Systems

14 SOLAR ENERGY
- 01 Resources and Availability
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 05 Solar Energy Conversion
- 06 Photovoltaic Power Plants
- 07 Solar Thermal Power Plants
- 08 Ocean Thermal Gradient Power Plants
- 09 Solar Radiation Utilization
- 10 Solar Collectors and Concentrators
- 20 Heat Storage

15 GEOTHERMAL ENERGY
- 01 Resource Status and Assessment
- 02 Geology, Hydrology, and Geothermal Systems
- 03 Geothermal Exploration and Exploration Technology
- 04 Legal and Institutional Aspects

15 GEOTHERMAL ENERGY (CONT.)

05 Economic and Financial Aspects
06 Environmental Aspects and Waste Disposal
07 By-Products
08 Geothermal Power Plants
09 Geothermal Engineering
10 Direct Energy Utilization
20 Geothermal Data and Theory

16 TIDAL POWER

03 Regulations
04 Economics
05 Environmental Aspects
07 Tidal Power Plants
08 Wave Energy Converters

17 WIND ENERGY

01 Availability (Climatology)
03 Regulations
04 Economics
05 Environmental Aspects
06 Wind Energy Engineering

20 ELECTRIC POWER ENGINEERING

01 Power Plants and Power Generation
02 Environmental Aspects
03 Power Transmission and Distribution

21 NUCLEAR POWER PLANTS

01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
03 Power Reactors, Non-Breeding, Graphite Moderated
04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
05 Power Reactors, Breeding
06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
07 Regulation and Licensing
08 Economics
09 Process Heat Reactors

22 NUCLEAR REACTOR TECHNOLOGY

01 Theory and Calculation
02 Components and Accessories
03 Fuel Elements
04 Control Systems
05 Environmental Aspects
06 Research, Test, and Experimental Reactors
07 Plutonium and Isotope Production Reactors
08 Propulsion Reactors
09 Reactor Safety

25 ENERGY STORAGE

01 Magnetic
02 Compressed Gas
03 Pumped Hydro
04 Capacitor Banks
05 Flywheels
06 Thermal
07 Liquefied Gas
08 Chemical
09 Batteries

29 ENERGY PLANNING AND POLICY

01 Energy Analysis and Modeling
02 Economics and Sociology
03 Environment, Health, and Safety
04 Natural Resources
05 Research, Development, Demonstration, and Commercialization
06 Nuclear Energy
07 Transport and Storage
08 Waste Heat Utilization
10 Conservation
20 Supply, Demand, and Forecasting
30 Policy, Legislation, and Regulation
40 Fossil Fuels
50 Hydrogen and Synthetic Fuels
60 Electric Power
80 Consumption and Utilization
90 Unconventional Sources and Power Generation

30 ENERGY CONVERSION

01 MHD Generators
02 EHD Generators
03 Thermoelectric Generators
04 Thermionic Converters
05 Fuel Cells
08 Electromechanical Converters

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

01 Buildings
02 Transportation
03 Industry and Agriculture
06 Municipalities and Community Systems
09 Education and Public Relations

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

01 Internal Combustion Engines
02 External Combustion Engines
03 Electric-Powered Systems
04 Hybrid Systems
05 Flywheel Propulsion
06 Vehicle Design Factors
07 Emission Control
08 Alternative Fuels

36 MATERIALS

01 Metals and Alloys
02 Ceramics, Cermets, and Refractories
03 Composite Materials
04 Polymers and Plastics
06 Other Materials

40 CHEMISTRY

01 Analytical and Separations Chemistry
02 Inorganic and Physical Chemistry
03 Organic Chemistry
04 Electrochemistry
05 Photochemistry
06 Radiation Chemistry
07 Radiochemistry and Nuclear Chemistry
08 Combustion Chemistry

42 ENGINEERING

01 General Engineering
02 Facilities and Equipment
03 Lasers
04 Heat Transfer and Fluid Flow
05 Materials Testing

42 ENGINEERING (CONT.)

06 Safety Engineering
07 Vacuum Engineering
08 Electronic Circuits and Devices
09 Waste Processing Plants and Equipment
10 Combustion Systems
20 Underground Engineering
30 Marine Engineering
40 Pollution Control Equipment
50 Power Cycles

43 PARTICLE ACCELERATORS

01 Design, Development, and Operation
02 Beam Dynamics, Field Calculations, and Ion Optics
03 Auxiliaries and Components
04 Storage Rings

44 INSTRUMENTATION

01 Radiation Instrumentation
02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
03 Miscellaneous Instruments
04 Well Logging Instrumentation

45 EXPLOSIONS AND EXPLOSIVES

01 Chemical
02 Nuclear
03 Explosion Detection

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

01 Basic Studies
02 Chemicals Monitoring and Transport
03 Radioactive Materials Monitoring and Transport
04 Thermal Effluents Monitoring and Transport
05 Site Resource and Use Studies
06 Regulations

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

01 Basic Studies
02 Chemicals Monitoring and Transport
03 Radioactive Materials Monitoring and Transport
04 Thermal Effluents Monitoring and Transport
05 Site Resource and Use Studies
06 Regulations

52 ENVIRONMENTAL SCIENCES, AQUATIC

01 Basic Studies
02 Chemicals Monitoring and Transport
03 Radioactive Materials Monitoring and Transport
04 Thermal Effluents Monitoring and Transport
05 Site Resource and Use Studies
06 Regulations

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

01 Social and Economic Studies
02 Assessment of Energy Technologies
03 Environmental Impact Statements

55 BIOMEDICAL SCIENCES, BASIC STUDIES
01 Behavioral Biology
02 Biochemistry
03 Cytology
04 Genetics
05 Metabolism
06 Medicine
07 Microbiology
08 Morphology
09 Pathology
10 Physiological Systems
20 Public Health
30 Agriculture and Food Technology

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
01 Radiation Effects
02 Thermal Effects
03 Chemicals Metabolism and Toxicity
04 Other Environmental Pollutant Effects

57 HEALTH AND SAFETY

58 GEOSCIENCES
01 Geology and Hydrology
02 Geophysics
03 Mineralogy, Petrology, and Rock Mechanics
04 Geochemistry
05 Oceanography

64 PHYSICS RESEARCH
01 Astrophysics and Cosmology
02 Atmospheric Physics
03 Atomic, Molecular, and Chemical Physics
04 Fluid Physics
50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
10 Nuclear Physics
40 Radiation and Shielding Physics
50 Medical Physics
60 Solid State Physics
70 Theoretical Physics
80 Mathematical Physics
90 Communication, Education, History, and Philosophy

70 FUSION ENERGY
01 Plasma Research
02 Fusion Power Plant Technology

99 GENERAL AND MISCELLANEOUS
01 Management
02 Mathematics and Computers
03 Information Handling
04 Law
05 Civilian Defense

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

SUBJECT CONTENTS (ALPHABETICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS
- 08 Alternative Fuels
- 03 Electric-Powered Systems
- 07 Emission Control
- 02 External Combustion Engines
- 05 Flywheel Propulsion
- 04 Hybrid Systems
- 01 Internal Combustion Engines
- 06 Vehicle Design Factors

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
- 03 Chemicals Metabolism and Toxicity
- 04 Other Environmental Pollutant Effects
- 01 Radiation Effects
- 02 Thermal Effects

55 BIOMEDICAL SCIENCES, BASIC STUDIES
- 30 Agriculture and Food Technology
- 01 Behavioral Biology
- 02 Biochemistry
- 03 Cytology
- 04 Genetics
- 06 Medicine
- 05 Metabolism
- 07 Microbiology
- 08 Morphology
- 09 Pathology
- 10 Physiological Systems
- 20 Public Health

40 CHEMISTRY
- 01 Analytical and Separations Chemistry
- 08 Combustion Chemistry
- 04 Electrochemistry
- 02 Inorganic and Physical Chemistry
- 03 Organic Chemistry
- 05 Photochemistry
- 06 Radiation Chemistry
- 07 Radiochemistry and Nuclear Chemistry

01 COAL AND COAL PRODUCTS
- 05 By-Products
- 40 Combustion
- 09 Environmental Aspects
- 60 Health and Safety
- 50 Marketing and Economics
- 20 Mining
- 04 Processing
- 06 Properties
- 70 Regulations
- 10 Reserves and Exploration
- 30 Transport and Handling
- 08 Waste Management

20 ELECTRIC POWER ENGINEERING
- 02 Environmental Aspects
- 01 Power Plants and Power Generation
- 03 Power Transmission and Distribution

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
- 01 Buildings
- 09 Education and Public Relations
- 03 Industry and Agriculture
- 06 Municipalities and Community Systems
- 02 Transportation

30 ENERGY CONVERSION
- 02 EHD Generators
- 08 Electromechanical Converters
- 05 Fuel Cells
- 01 MHD Generators
- 04 Thermionic Converters
- 03 Thermoelectric Generators

29 ENERGY PLANNING AND POLICY
- 10 Conservation
- 80 Consumption and Utilization
- 02 Economics and Sociology
- 60 Electric Power
- 01 Energy Analysis and Modeling
- 03 Environment, Health, and Safety
- 40 Fossil Fuels
- 50 Hydrogen and Synthetic Fuels
- 04 Natural Resources
- 06 Nuclear Energy
- 30 Policy, Legislation, and Regulation
- 05 Research, Development, Demonstration, and Commercialization
- 20 Supply, Demand, and Forecasting
- 07 Transport and Storage
- 90 Unconventional Sources and Power Generation
- 08 Waste Heat Utilization

25 ENERGY STORAGE
- 09 Batteries
- 04 Capacitor Banks
- 08 Chemical
- 02 Compressed Gas
- 05 Flywheels
- 07 Liquefied Gas
- 01 Magnetic
- 03 Pumped Hydro
- 06 Thermal

42 ENGINEERING
- 10 Combustion Systems
- 08 Electronic Circuits and Devices
- 02 Facilities and Equipment
- 01 General Engineering
- 04 Heat Transfer and Fluid Flow
- 03 Lasers
- 30 Marine Engineering
- 05 Materials Testing
- 40 Pollution Control Equipment
- 50 Power Cycles
- 06 Safety Engineering
- 20 Underground Engineering
- 07 Vacuum Engineering
- 09 Waste Processing Plants and Equipment

52 ENVIRONMENTAL SCIENCES, AQUATIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
- 02 Assessment of Energy Technologies
- 03 Environmental Impact Statements
- 01 Social and Economic Studies

45 EXPLOSIONS AND EXPLOSIVES
- 01 Chemical
- 03 Explosion Detection
- 02 Nuclear

70 FUSION ENERGY
- 02 Fusion Power Plant Technology
- 01 Plasma Research

06 FUSION FUELS
- 03 By-Products
- 09 Environmental Aspects
- 05 Health and Safety
- 02 Processing
- 08 Properties
- 06 Regulations and Policy
- 01 Sources
- 04 Transport and Storage
- 07 Waste Management

99 GENERAL AND MISCELLANEOUS
- 05 Civilian Defense
- 03 Information Handling
- 04 Law
- 01 Management
- 02 Mathematics and Computers

58 GEOSCIENCES
- 04 Geochemistry
- 01 Geology and Hydrology
- 02 Geophysics
- 03 Mineralogy, Petrology, and Rock Mechanics
- 05 Oceanography

15 GEOTHERMAL ENERGY
- 07 By-Products
- 10 Direct Energy Utilization
- 05 Economic and Financial Aspects
- 06 Environmental Aspects and Waste Disposal
- 02 Geology, Hydrology, and Geothermal Systems
- 20 Geothermal Data and Theory
- 09 Geothermal Engineering
- 03 Geothermal Exploration and Exploration Technology
- 08 Geothermal Power Plants
- 04 Legal and Institutional Aspects
- 01 Resource Status and Assessment

57 HEALTH AND SAFETY

13 HYDRO ENERGY
- 05 Economics and Management
- 06 Environmental Aspects
- 03 Plant Design and Operation
- 07 Power Conversion Systems
- 04 Regulations and Licensing
- 01 Resources and Availability
- 02 Site Geology and Meteorology

08 HYDROGEN
- 07 By-Products
- 09 Environmental Aspects
- 06 Industrial and Commercial Use
- 04 Marketing and Economics
- 01 Production
- 08 Properties
- 05 Safety
- 02 Storage
- 03 Transport

44 INSTRUMENTATION
- 03 Miscellaneous Instruments
- 02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
- 01 Radiation Instrumentation
- 04 Well Logging Instrumentation

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 03 Isotopic Power Supplies
- 01 Physical Isotope Separation
- 02 Radiation Sources

36 MATERIALS
- 02 Ceramics, Cermets, and Refractories
- 03 Composite Materials
- 01 Metals and Alloys
- 06 Other Materials
- 04 Polymers and Plastics

03 NATURAL GAS
- 09 Artificial Stimulation, Plowshare, etc.
- 40 Combustion
- 03 Drilling, Production, and Processing
- 08 Environmental Effects
- 02 Geology and Exploration
- 05 Health and Safety
- 06 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Products and By-Products
- 30 Properties
- 01 Reserves
- 50 Storage
- 20 Transport, Pipelines, and Handling
- 07 Waste Management

05 NUCLEAR FUELS
- 06 By-Products
- 05 Enrichment
- 30 Environmental Aspects
- 02 Exploration
- 04 Feed Processing
- 07 Fuels Production and Properties
- 40 Health and Safety
- 10 Marketing and Economics
- 03 Mining
- 50 Regulations
- 01 Reserves
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 20 Waste Management

21 NUCLEAR POWER PLANTS
- 08 Economics
- 06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
- 05 Power Reactors, Breeding
- 03 Power Reactors, Non-Breeding, Graphite Moderated
- 01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
- 04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
- 09 Process Heat Reactors
- 07 Regulation and Licensing

22 NUCLEAR REACTOR TECHNOLOGY
- 02 Components and Accessories
- 04 Control Systems
- 05 Environmental Aspects
- 03 Fuel Elements
- 07 Plutonium and Isotope Production Reactors
- 08 Propulsion Reactors
- 09 Reactor Safety
- 06 Research, Test, and Experimental Reactors
- 01 Theory and Calculation

04 OIL SHALES AND TAR SANDS
- 06 Direct Uses and By-Products
- 03 Drilling, Fracturing, and Mining
- 10 Environmental Aspects
- 07 Health and Safety
- 08 Marketing and Economics
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 20 Regulations
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 09 Waste Research and Management

09 OTHER SYNTHETIC AND NATURAL FUELS
- 02 Alcohol Fuels
- 06 Gaseous Waste Fuels
- 01 Hydrocarbon Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 05 Liquid Waste Fuels
- 04 Solid Waste Fuels

43 PARTICLE ACCELERATORS
- 03 Auxiliaries and Components
- 02 Beam Dynamics, Field Calculations, and Ion Optics
- 01 Design, Development, and Operation
- 04 Storage Rings

02 PETROLEUM
- 50 Combustion
- 03 Drilling and Production
- 09 Environmental Aspects
- 02 Geology and Exploration
- 06 Health and Safety
- 07 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Processing
- 05 Products and By-Products
- 30 Properties
- 01 Reserves
- 40 Storage
- 20 Transport, Pipelines, and Handling
- 08 Waste Management

64 PHYSICS RESEARCH
- 01 Astrophysics and Cosmology
- 02 Atmospheric Physics
- 03 Atomic, Molecular, and Chemical Physics
- 04 Fluid Physics
- 50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
- 90 Communication, Education, History, and Philosophy
- 80 Mathematical Physics
- 50 Medical Physics
- 10 Nuclear Physics
- 40 Radiation and Shielding Physics
- 60 Solid State Physics
- 70 Theoretical Physics

14 SOLAR ENERGY
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 20 Heat Storage
- 08 Ocean Thermal Gradient Power Plants
- 06 Photovoltaic Power Plants
- 01 Resources and Availability
- 10 Solar Collectors and Concentrators
- 05 Solar Energy Conversion
- 09 Solar Radiation Utilization
- 07 Solar Thermal Power Plants

16 TIDAL POWER
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 07 Tidal Power Plants
- 08 Wave Energy Converters

17 WIND ENERGY
- 01 Availability (Climatology)
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 06 Wind Energy Engineering

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

ENERGY RESEARCH ABSTRACTS

01 COAL AND COAL PRODUCTS

REFER ALSO TO CITATION(S) 33357

32941 (DOE/FE/60181—4) Evolution of the UND-government-industry partnership in low-rank coal research. Wiltsee, G.A.; Fletcher, A.G.; Severson, D.E.; Sondreal, E.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center; North Dakota Univ., Grand Forks (USA). School of Engineering and Mines; North Dakota Univ., Grand Forks (USA). Dept. of Chemical Engineering; USDOE Grand Forks Energy Technology Center, ND). 1983. Contract FC01-83FE60181. 27p. (CONF-830542—2). NTIS, PC A03/MF A01. Order Number DE83011484.

From 12. lignite conference; Grand Forks, ND, USA (18 May 1983).

The coincidence in 1983 of three significant events - the 100th birthday of the University of North Dakota, the Twelfth Biennial Lignite Symposium, and the transfer of the Energy Research Center from the United States Department of Energy to the University of North Dakota - has prompted the authors to indulge in some reminiscing about the history of coal research in Grand Forks. Since the first decade of the University's existence, there has been a continuous effort here to help industry better develop and utilize the vast resources of low-rank coal found in the state of North Dakota, and in many other states as well. The effort has involved a true partnership of the University with the coal and utility industries and with interested and sponsoring government agencies. This brief history of that partnership is not intended to be complete in every detail. It places more emphasis on the early work than on the more recent work of the low-rank coal researchers in Grand Forks. Hopefully, it will serve the useful purpose of placing our current programs and interactions in a better perspective, while at the same time acknowledging and honoring the fine work done by many people, upon which we will continue to build.

0104 Processing

REFER ALSO TO CITATION(S) 32941, 33014, 33015, 33015, 33021, 33021, 33068, 33069, 33070, 33083, 33097, 33098, 33101, 33267, 33267, 33272, 33273, 33707, 33976, 34004, 34095, 34112

32942 (ANL/FE—83-8) Feasibility study of acoustic sensors for slurry-level measurements in coal-liquefaction systems. Gopalsami, N.; Raptis, A.C. (Argonne National Lab., IL (USA)). Apr 1983. Contract W-31-109-ENG-38. 34p. NTIS, PC A03/MF A01. Order Number DE83011926.

This report addresses the problem of slurry-level measurement in the high-pressure separators of coal-liquefaction systems. Besides high pressure, the separator-vessel environment is hostile and at high temperature. A survey is made of the level-measurement methods and devices that may be applicable to continuous slurry-level service. The survey includes displacement, differential pressure, capacitance, electrical TDR, microwave, nuclear, and acoustic devices. From the capabilities and limitations of these devices, the acoustic sensor holds promise in meeting the application requirements, since it is nonintrusive, intrinsically safe, easily adaptable to high pressures and temperatures, and fairly accurate. The method of acoustic pulse-echo measurements is further investigated with regard to its feasibility in slurry-level service. This entails computing the attenuation in the slurry and vapor (gas) spaces of the separator vessel and estimating the feasible measurement ranges. With the limited data available on the density, viscosity, etc., of slurries from the SRC-I pilot plant at Wilsonville, Alabama, the estimated measurement range using 100 kHz in 25 wt% coal slurry is about 2.5 m. Much higher ranges (~ 15 m) are found to be possible with gaseous media. A measurement scheme is proposed for echo ranging from the top of the vessel. Possible error sources and the means of correcting or compensating them are discussed. 12 figures, 2 tables.

32943 (BMFT-FB-T—82-170) Testing of heat exchanger systems for reheating flue gases from wet scrubbing desulfurization plants. Than, K. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 128p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750078.

Portions are illegible in microfiche products.

The present research project has the objective to test two heat exchanger systems, namely - the cyclic process of GEA and - the plate heat exchanger of Kablitz/Thyssen, for reheating flue gases - which have been cooled to about 50 to 55°C due to wet scrubbing - to the required temperature at the outlet of the stack by extracting the sensible heat of the hot flue gases. Main emphasis of the investigation is on the problem of building materials and on keeping clean the heat exchanger surface.

32944 (BMFT-FB-T—83-003) SRC II - demonstration plant project for synfuel production from coal in the USA. Langhoff, J.; Wolowski, E.; von Diest, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 88p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750865.

The Design Engineering for the SRC II-Demonstration Plant Project for the production of Coal Oil in the USA was started late 1979 and was terminated by the United States Department of Energy (DOE) in July 1981. Project activities since then have been finished in accordance to a termination plan. Coal conversion plants for the production of synfuel, - crude oil and natural gas substitutes -, could reduce the crude oil import dependence. International cooperation was foreseen to build and operate such coal conversion plants on a large scale. Planning, construction and operation of the Demonstration Plant comprized a four-phase program: Phase 0 - Preliminary Conceptual Design; Phase I - Detail / Final Design; Phase II - Procurement and Construction; Phase III - Operation and Evaluation; The Demonstration Plant was planned for a site at Morgantown, West Virginia/USA. In September 1980 DOE had contracted SRC International Inc. in Denver/USA for the project performance. Project financing was provided by the governments of the USA, the Federal Republic of Germany, and of Japan. The Minister of Research and Technology, Bonn, had supported the project preplanning and the SRC II - process development activities since 1974. Planning and project documents prepared to the July 1981 project termination date were included into a specified project documentation system, which is available to the participating governments.

32945 (CONF-830549—1) Improving coal-liquid quality by heavy-distillate recycle. Anderson, R.P.; Freel, J. (Gulf Research and Development Co., Pittsburgh, PA (USA)). 1983. Contract AC22-82PC50001. 18p. NTIS, PC A02/MF A01. Order Number DE83011351.

From 7. annual EPRI contractors' conference on coal liquefaction; Palo Alto, CA, USA (11 May 1983).

Recent runs in the Merriam Laboratory continuous coal liquefaction unit show that heavy distillate can be recycled to extinction; i.e., a product boiling entirely below 590°F (or other selected boiling point) is feasible. Distillate yield was not reduced. Gas make was unaffected. And hydrogen consumption increased only slightly, in keeping with the generally higher hydrogen content of light products. Total distillate yield (C_4-590°F) was 56 wt %, MAF coal in runs with subbituminous coal from the Amax Belle Ayr mine.

The product endpoint is well below 700°F, the temperature above which coal distillates appear to become genotoxic; and the product was shown to be free of mutagenic activity in the Ames test. Other studies suggest the product should be more readily upgraded than full-range (C_5-900°F) distillate.

32946 **(DOE/CH/00016—1402) Flash pyrolysis of coal with reactive and non-reactive gases. Progress report, October 1, 1981-September 30, 1982.** Steinberg, M.; Fallon, P.T.; Sundaram, M.S. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 96p. NTIS, PC A05/MF A01. Order Number DE83011264.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents the results of the first year's work. The purpose of the program is to develop a data base for the process chemistry of the flash pyrolysis of coal with both reactive gases (H_2, CH_4, CO and CO_2) and non-reactive gases (He, N_2 and Ar). The yields and distribution of products are presented as a function of the reaction variables. A 1 in. ID by 8 ft long downflow entrained tubular reactor was used to obtain product yields and distribution as a function of the process variables. The pyrolysis of New Mexico sub-bituminous coal was performed at temperatures ranging from 825 to 1000°C and at gas pressures ranging from 20 to 1000 psi. Residence time of the coal particles at reactor conditions ranged from 0.5 to 8 sec. Pyrolysis in reactive gases caused higher conversion of coal than that in non-reactive gases. The total carbon conversion to gaseous and liquid products correlated in the following order: $H_2 > CH_4 > He > CO > N_2 >$ Ar. For the reactive gases, H_2, CH_4 and CO at 900°C and 200 psi, the total carbon conversion to gaseous and liquid products was 37.6%, 30.4% and 17.5, respectively. For the non-reactive gases, He, N_2 and Ar, the yields were 16.6%, 15.3% and 9.3%. A correlation appears to exist between the yields and heat-up rate of the coal particles for the inert gases in the order of $He > N_2 >$ Ar. The flash pyrolysis in methane was characterized by a high yield of ethylene, reaching 10.5% at 825°C and 50 psi, which was approximately two times higher than with inert helium gas under similar conditions. Phenols, if any, were present only in trace amounts in the light oil fraction of the liquid products. The yield of tar increased with increase in the pressure of helium but decreased with increase in the pressure of hydrogen. The composition of tar depended on the nature of the pyrolyzing gas. 43 figures, 13 tables.

32947 **(DOE/ET/10532—T11) Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Task 10. Hydrotreating of EDS and H-Coal blends for biological studies. Seventh interim report.** Sullivan, R.F. (Chevron Research Co., Richmond, CA (USA)). Jan 1983. Contract AC22-76ET10532. 58p. (FE—2315-84). NTIS, PC A04/MF A01. Order Number DE83007200.

Samples of EDS and H-Coal distillates were hydrotreated at different severity levels for biological studies to be conducted at Oak Ridge National Laboratory (ORNL). Sample preparation conditions were purposely selected to obtain a broad range of processing severities. Pilot plant tests for this added task are complete.

32948 **(DOE/ET/13153—T9) Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982.** Russel, W.B.; Saville, D.A. (Princeton Univ., NJ (USA). Dept. of Chemical Engineering). 1982. Contract AC01-79ET13153. 63p. NTIS, PC A04/MF A01. Order Number DE83011000.

Portions are illegible in microfiche products.

This document reports data on the kinetics of devolatilization under controlled conditions and the accompanying physical transformations for two coals (PSOC 102 and 190). The experiments employed a captive sample reactor designed to provide rapid heating (up to 10^4 K/s) and quench ($> 3 \times 10^3$ K/s) over a wide range of reaction temperatures, pressures, and times. Kinetics were resolved both during heatup at a constant rate and in 0.1 s increments during the subsequent isothermal reaction period. A scanning electron microscope was used to investigate the macropore structure; CO_2 adsorption measurements made with a dynamic technique reflect changes in micropore volume. The results reveal significant effects of particle size and heating rate on pyrolysis yields in vacuum and confirm the strong dependence on temperature, pressure, and hydrogen partial pressure observed by others. Qualitative observations of tar evolution and softening and swelling phenomena suggest that secondary reactions in the liquid phase are responsible for the reductions in yield at higher pressures, lower temperatures, lower heating rates, or larger particle sizes. The significance of these results with respect to improved models of the devolatilization process and optimum processing conditions are discussed.

32949 **(DOE/FE/55014—T2) Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983.** (Great Plains Gasification Associates, Detroit, MI (USA)). 1983. Contract FM01-82FE55014. 178p. NTIS, PC A09/MF A01. Order Number DE83011547.

Portions are illegible in microfiche products.

Activities remain on schedule to meet GPGA's start-up and coal delivery dates as well as the completion of the pipeline. Engineering is essentially on schedule and complete for the Plant. Most of the key engineering goals needed to support the construction phase were completed during the first quarter. A substantial amount of construction progress has been accomplished. Although overall construction is behind schedule, it is currently forecasted that construction will be back on schedule by the end of October, 1983. Start-Up Planning is progressing at a rapid pace. The current emphasis is on consolidating construction planning and completion in accordance with detailed start-up scheduling requirements. Work is also being directed to the development and finalization of plant operating manuals and a materials management system. Mine development activities remain on schedule. Most of the environmental permitting for the construction phase of the project has been completed. Engineering for the pipeline is complete. Construction should commence in early May and should be completed one month prior to the earliest need date.

32950 **(DOE/MC/14731—T1) Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982.** Tamhankar, S.S. (West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering). 1982. Contract AT21-81MC14731. 8p. NTIS, PC A02/MF A01. Order Number DE83006600.

This report describes the technical progress made during the third quarter of this project involving experimental studies on the kinetics of the catalytic cracking of benzene. The aim of this work is to identify and evaluate a catalyst which would be effective in controlling hyrocarbon emissions from a coal gasifier. In general, the objectives are to identify an active catalyst for benzene cracking, to study the cracking kinetics and catalyst deactivation, and to formulate a reaction rate model for use in reactor design. Experiments are to be carried out in a laboratory fixed-bed reactor, and the product analysis done using a gas chromatograph and other appropriate techniques. During this quarter the reactor system developed earlier was modified to achieve a better performance, and cracking experiments were initiated in order to compare the activity of a few selected catalysts. Greer limestone (precalcined) and an iron oxide (45%)-silica (55%) catalyst were tested. Both catalysts gave about the same conversion levels. (DMC)

32951 **(DOE/MC/14731—T2) Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982.** Wen, C.Y.; Tamhankar, S.S. (West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering). 1982. Contract AT21-81MC14731. 15p. NTIS, PC A02/MF A01. Order Number DE83006646.

The most convenient way to eliminate hydrocarbons in the product gases of coal gasifiers is to crack them to lower molecular weight compounds using a catalyst. The objective of this work is to study kinetics of catalytic cracking of benzene using a catalyst, selected based on literature search, and to investigate effects of conditions prevailing in a typical gasifier. The aim is to identify and evaluate a catalyst which would be effective in controlling hydro-

carbons emission from a gasifier, itself. This work will entail the current efforts to identify, through literature search, materials for in-bed control of hydrocarbons, alkali, and trace metals. The emphasis will be on materials that show potential for multifunctionality. The scope of the work will mainly include kinetic studies on benzene cracking using a selected catalyst, investigation of catalyst deactivation and poisoning effects, if any, and reaction rate modeling. The work on reactor system development of the project commenced in September 1981. In the initial few months time was devoted to the designing of the reactor assembly, and procurement of equipment and supplies needed for the experimental work. System performance tests were performed to identify the proper isothermal temperature zone for this operation. Two catalyst materials were chosen for the preliminary tests, a Greer limestone, and iron oxide (45%) - silica (55%) sorbent. (DMC)

32952 **(DOE/MC/19403—1) Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982.** Anderson, G.L.; Garrigan, P.C.; Claar, T.D.; Berry, F.O.; Ong, E. (Institute of Gas Technology, Chicago, IL (USA)). May 1983. Contract AC21-82MC19403. 30p. NTIS, PC A03/MF A01. Order Number DE83011892.

The overall objectives of this program are to conduct: (1) Laboratory-scale and bench-scale studies of a conceptual process that uses an air-regenerable mixture of metal oxide sorbents to remove sulfur-containing gases (such as hydrogen sulfide) from coal-derived fuel gas at 1200°F. This mixture promotes the direct production of elemental sulfur upon regeneration. (2) Laboratory-scale studies of a process that uses molten-carbonate-containing porous ceramics to remove hydrochloric acid (HCl) and possibly heavy hydrocarbons and trace-element-containing compounds from coal-derived fuel gas at 1200°F. (3) An engineering and economic assessment of the above processes. During this reporting period, preparations were made for laboratory-scale testing of sorbents for both processes. Five metal oxide sorbents were selected for laboratory-scale testing of their sulfur removal characteristics, sulfur removal capacities, and elemental sulfur production capabilities. These were (1) manganous oxide, (2) cobalt aluminate, (3) iron chromite, (4) iron orthosilicate, and (5) cobalt titanate. The laboratory-scale fixed-bed reactor system for testing the metal oxide sorbents was readied this quarter. Several modifications were made to the existing system. Testing of the metal oxide sorbents will begin next quarter. The selection of two HCl removal sorbents for laboratory-scale testing was also made this quarter. The molten alkali mixtures chosen were a 52% lithium carbonate/48% sodium carbonate mixture and a 43% lithium carbonate/57% potassium carbonate mixture with melting points of 496 and 488°C, respectively. The porous ceramic selected for supporting the molten carbonate mixtures was magnesia, MgO.

32953 **(DOE/METC/SP—195) Fixed-bed gasification.** (USDOE Morgantown Energy Technology Center, WV). Sep 1982. 34p. NTIS, PC A03/MF A01. Order Number DE83011811.

This report briefly describes the background of coal gasification in this country and abroad, the relationship between fixed-bed and alternate gasification technologies, and DOE's role in developing this technology so that it can be properly used in today's energy market within the current environmental guidelines. The report also describes, in limited detail, the evolution of the Morgantown Energy Technology Center (METC) pilot plant, its current status, and the related projects that are utilizing this facility.

32954 **(DOE/NBM–3011540) Summary of university contracts and grants supported by Office of Fossil Energy, FY 82.** (JWK International Corp., Pittsburgh, PA (USA)). 1982. 470p. NTIS, PC A20/MF A01. Order Number DE83011540.

Front-end R and D support is provided in several areas of fossil fuel technology through the Office of Fossil Energy, and is geared toward establishing an adequate scientific and engineering knowledge base to foster technological advances through private sector initiative as well as to remove key uncertainties. Since January 1981, the Office of Fossil Energy has reoriented its program to meet the newly defined roles of the private sector and Government in technology development as outlined in the Administration's policy and guidelines. Fossil Energy's university activities emphasize the type of research that universities can do best - research to explore the potential of novel process concepts, develop innovative methods and materials for improving existing processes, and obtain fundamental information on the structure of coal and mechanisms of reactions of coal, shale oil, and other fossil energy sources. Fossil Energy's support to universities is designed to (1) ensure a foundation for innovative technology through the use of the capabilities and talents in our academic institutions, (2) provide an effective, two-way channel of communication between the Office of Fossil Energy and the academic community, and (3) ensure that trained technical manpower is developed to carry out basic and applied research in support of Fossil Energy's mission. One page fact sheets are included for each contract or grant providing business information, objectives of research, statement of work, and major accomplishments. Names of the Technical Project Officer are provided on each fact sheet.

32955 **(DOE/NBM—3011541) Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982.** (JWK International Corp., Pittsburgh, PA (USA)). 1982. 274p. NTIS, PC A12/MF A01. Order Number DE83011541.

Within the Fossil-Energy Program, there are two subprograms that fund long-range, high-risk, and potentially high pay-off basic applied research. One of these subprograms, entitled Advanced Research and Technology Development (AR and TD), is for coal. The other subprogram, entitled, Advanced Process Technology (APT), is for oil, gas, tar sands, shale oil, and unconventional hydrocarbons. These subprograms fund projects designed to establish technology basis which will be useful in the development of fossil energy processes. One-page fact sheets are presented for each project, contract or grant providing business information, objectives of the research, statement of work, and major accomplishments. The responsible Technical Project Officer is named on each fact sheet.

32956 **(DOE/NBM—3012266) Report of the Energy Research Advisory Board study group to evaluate the proposed Coal-Gasification Multi-Test Facility.** (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). Nov 1979. 14p. NTIS, PC A02/MF A01. Order Number DE83012266.

By memorandum from (then) Under Secretary of the Department of Energy Dale Myers dated December 20, 1978 to Dr. John Deutch, the Energy Research Advisory Board (ERAB) was requested to review and comment on the specifications for the proposed Multi-Test Facility for Gasification Systems (MTF) Project. At the May 1979 ERAB quarterly meeting, the DOE's desire for such a review was reaffirmed. The MTF facility, as described in the conceptual design study, would be a federally owned and contractor operated test facility for commercial-scale coal gasification equipment. The concept of the MTF is for a developmental coal gasification, gas treating and conversion facility that would contain all the equipment needed for testing new gasifiers (i.e., coal storage and handling equipment, utilities, gas cleanup units and gas conversion systems. The proposed advantages of the MTF are described. The Study Group established to review the MTF recommends that, before the DOE considers approving the next phase of the project, the first three concerns discussed above regarding (1) technical validity of the concept, (2) the costs and benefits of the MTF, and (3) the extent and quality of industry participation be addressed through further studies. Adequate and proper resolution of these concerns is fundamental to determining the appropriateness of the MTF, and DOE should not proceed without convincing evidence that these concerns will be obviated or dealt with satisfactorily. While the latter two of the five concerns relating to relative effectiveness are important, they could be overcome assuming the first three problems can be resolved. Justification for the recommendation is given in detail.

32957 **(DOE/PC/51252—T2) Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983.** Tsotsis, T.T. (University of Southern California, Los Angeles (USA). Dept. of Chemical Engineering). 1983. Contract FG22-82PC51252. 59p. NTIS, PC A04/MF A01. Order Number DE83011909.

We have recently completed our theoretical investigation of deactivation by site coverage and pore blockage for parallel type deactivation kinetics. We have modified our previous theoretical model to include a coke size parameter b_1 which is independent of the pore radius. We believe that our model, as it now stands, is a more realistic representation of the phenomenon of deactivation as it occurs in industrial catalytic reactor systems. We have extended our analysis to include the effect of pore size distribution. We have shown that catalysts with a uniform pore size distribution are not necessarily characterized by optimum initial activity, contrary to what has so far been believed to be the case in the literature. A complete literature search of the literature pertinent to coal liquefaction since 1970 has recovered over 750 titles in the form of quarterly, progress, annual and final reports. We have also completed our literature search on the subject of deactivation, which covered the period from January of 1970 to January 1983. We have focused our attention on a number of chemical engineering and chemistry journals, and a complete manual search was completed of all titles dealing both with theoretical and experimental aspects of the phenomenon of deactivation.

32958 **(KHM-TR—21) Cleaning of steam coal prior to combustion.** Forssberg, E. (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Mar 1981. 87p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750470.

Portions are illegible in microfiche products.

The report comprises the coal properties necessary and the method for coal cleaning prior to combustion. The presentation is confined to mineral processing methods for coal cleaning. Several coal properties and characteristics are of importance in the evaluation of the cleaning potential. Reduction of the sulphur content will be facilitated if a large fraction of the sulphur is accounted for as pyrite. A washability analysis is very useful for a reliable prediction of the possibilities to clean coal. The maceral composition of the coal is important for cleaning although all aspects are not yet clear. Petrographic examination of the coal structure, is of paramount importance in evaluating the coal cleaning potential. The separation efficiency is normally decreasing with the particle size. Coarse particle jigs and heavy media static baths are used for beneficiation of coal in the fraction 10 - 150 mm. Both those methods are based on differencies in density. Heavy media cyclones are replacing the static baths for particle sizes below 10 mm. Hydrocyclones are common for the fractions below 0.5 mm and are working with plain water as media. However the separation is less complete than for the heavy media cyclones. Flotation is used for particles below 0.5 mm and is based on the natural hydrophobic character of the coal. Coal made hydrophobic normally showes good selectivity towards ash minerals but often inferior selectivity towards pyrite. The differencies in hydrophobicity or wetability for coal and ash minerals are utilized in oil agglomeration. The oil agglomeration method is primarily intended for coal < 0.10 mm and generally gives low selectivity towards pyrite. High gradient wet magnetic separation has been introduced in the last few years as a method to desulphurize coal.

32959 **(NP—3770105) Investigation of flow bed models for hydrogenating coal gasification.** Guenther, A. (Hannover Univ. (Germany, F.R.). Fakultaet fuer Mathematik und Naturwissenschaften). 5 May 1980. 126p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770105.

Portions are illegible in microfiche products; Thesis.

The heat conductivity of a continuous flow bed of residual coke, the influence of baffles on the heat transport and the heat transfer between one wall and the flow bed were investigated to evaluate the residual coke cooling. Measurements of the properties of the rising gas bubbles in the flow bed are performed. A gas distributor for gas absorption of the reactor was found for a model of the pilot plant reactor for hydrogenating coal gasification in original size. This gas distributor well fluidizes the different solids used and is used as gas supply line in the form of a narrow horizontal pipe through the bed with boreholes allowing the gas to escape. Measurement of the gas bubble properties inside the system are especially used in the investigation and optimization of such gas distributors.

32960 **(ORNL/TM—8576) Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment.** Harris, M.T.; Jolley, R.L.; Oswald, G.E.; Rose, J.C. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 50p. NTIS, PC A03/MF A01. Order Number DE83012526.

The wet oxidation of phenol and naphthalene in distilled water and municipal sludge has been investigated in a 1-L autoclave at temperatures from 130 to 250°C, oxygen presures of 6 to 11.2 MPa, and initial phenol and naphthalene concentrations of 10 mg/L to 16 g/L and 10 mg/L to 420 mg/L, respectively. The reaction of phenol in water is rapid; 95% of the phenol degrades in less than 15 min at operating temperatures above 175°C. The oxidation of phenol in sludge is mass-transfer limited and therefore yields lower rate-constant values. The reaction of phenol in water or sludge is postulated to involve a free-radical mechanism and proceeds in three steps: an induction step, a rapid first-order step, and a slower first-order step. The rapid first-order step for the phenol-water study is temperature dependent and follows the Arrhenius expression given. The slower first-order step is due to an inhibition of the rate of phenol oxidation by organic intermediates. The major organic intermediates formed during the wet oxidation of phenol are hydroquinone, catechol, succinic acid, and glycolic acid. Greater than 98% oxidation of naphthalene at milligram-per-liter concentrations in water was observed in less than 10 min. The rate of oxidation of naphthalene in sludge is inhibited by either mass transfer and/or oxidizable organics. A pseudo-first-order reaction was observed for the oxidation of naphthalene in water and sludge. The first-order rate constants are given. Essentially none of the naphthalene is completely oxidized to carbon dioxide and phthalic anhydride is the principal product for the wet oxidation of naphthalene.

32961 **(SAND—82-2355) Proceedings of the eighth underground coal conversion symposium.** Hudson, S.R. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). Nov 1982. Contract AC04-76DP00789. 562p. (CONF-820840—). NTIS, PC A25/MF A01. Order Number DE83006261.

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents the results of a four-day symposium which reviewed the state-of-the-art, field testing and recent progress in underground coal conversion. The symposium was held at Keystone Lodge, Colorado, August 15-19, 1982, and was sponsored by the US Department of Energy and hosted by Sandia National Laboratories. Over 100 attendees participated in this seminar which offered more than 60 presentations in both poster and oral sessions on The Status of UCC Technology, Achievements and Problems of UCC, Future R and D Activities, and Roles and Outlooks, for an overall theme of Where Do We Go From Here. This symposium was structured to deal with an evaluation of the present uncertainty in future federal funding of UCC. Panel discussions were held after each oral session to address this overall question. The final session of the symposium was a summary session reflecting the thoughts of all panelists and symposium speakers. This session also serves as our Executive Summary (page 567). Forty-one papers have been entered individually into EDB and ERA; twelve papers had been entered previously. (LTN)

32962 (SAND—82-2355, pp 27-32) **Industrial viewpoint of synthetic fuels.** Singleton, A.H. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Gulf Research and Development Company has taken a leading role in developing technology for the production of synthetic fuels through underground coal gasification. This paper presents

some of the characteristics of the technology and the way in which it could be applied to commercial projects. Comparisons are drawn with other types of synthetic fuel processes. Events in the recent past have demonstrated that no single company has been willing to shoulder the full risk and liability of following through to commercialization. Continuing developments illustrating the economic incentives of UCG-SDB technology relative to competing conventional fuels/feedstocks cause us to believe that the incentives, and hence the probability, of assembling a project and project backing are increasing to the point where it is likely to happen within the next year.

32963 (SAND—82-2355, pp 49-58) **Rawlins Test 2 data analysis.** Ahner, P.F.; Bencini, J.F.; Bloomstran, M.A. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The second and final test in the Underground Coal Gasification of Steeply Dipping Beds (UCG-SDB) was completed in November 1981 on a site near Rawlins, Wyoming. The feasibility of steam/oxygen injection in both a slant injection well (Module 1) and a vertical injection well (Module 2) was investigated. The data from the various test phases was modeled using a step-wise regression analysis routine. Process efficiencies were also calculated for each phase. Linear regression models described the Module 1 operations very well, with correlation coefficients for the production rate and composition greater than 0.85 in most cases. Average error was generally below 15% at nominal flow rates. Module 1 equations indicate that the steam-char, methanation and water-gas shift reactions were very extensive and explain the high thermal and production efficiencies seen during the test. The modeling attempt on Module 2 data was not as successful with correlation coefficients ranging around 0.70. Module 2 had high water influx and extensive override which led to unstable and constantly declining product gas quality. The huff-'n-puff phase, in which oxygen flow rates held constant, is a method that holds promise of being able to increase product yield. Slant injection operation was clearly the most efficient of the three modes of operation: slant, vertical, and dual. In slant mode, approximately 88% of the energy in the coal was produced as combustion energy available in the product gas. During vertical injection operation, 76% of the energy was produced as combustion energy; while simultaneous operation of both vertical and slant injection yielded 83%.

32964 (SAND—82-2355, pp 71-79) **UCG test facility design criteria and evaluation.** Bebout, R.A.; Damin, D.G. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Specific recommendations for future UCG facilities are: (1) Do not use non-standard materials and equipment, as standard industrial practices and commercially available materials and equipment satisfied all design criteria, technical objectives, and operational criteria. (2) Eliminate orifice plates for all flow measurements and use annubars. Annubars provide a wider flow span and greater accuracy. (3) Expand the use of power actuated valves, particularly for all frequently adjusted valves and the product wellhead blocking valve. (4) Provide a multistep pressure reduction process for product gas utilization. The single-step procedure used during Test 2 resulted in pressure spikes to the boilers. (5) Install steam purge lines for periodic cleaning of sample takeoffs or other ancillary lines to eliminate plugging and operational problems. (6) Provide adequate back-up to the oxidant injection system. The two compressors used during Test 2 were insufficient to maintain operations for an extended period.

32965 (SAND—82-2355, pp 103-114) **Rawlins UCG test 2 reactor growth.** Garon, A.M.; Cala, G.C.; Avasthi, J.M. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Results from the reactor growth investigation during the second field test of Underground Coal Gasification (UCG) in Steeply Dipping Beds (SDB) near Rawlins, Wyoming, are presented. Data collected and monitored from ten types of instrumentation systems and measurement techniques are included. Additional information from post-test analyses are also discussed. The conclusions derived from the current interpretation of the reactor definition instrumentation and measurement techniques are as follows: (1) the Fire Pit concept of UCG in SDB was supported; (2) HFEM measurements provided useful information but the signature changes were subtle in comparison to previous applications; (3) the primary link from the SIW to SPW intersected the open borehole near the casing show rather than at the base of the SPW; (4) the burned region, containing the hottest reaction zone and the ash-slag zone, began low in the coal seam near the base of the SIW and expanded very little; (5) the affected coal region began to the north of the open borehole at the SIW and expanded rapidly updip and southward toward the SPW casing show; and (6) coal movement into the affected region was usually continuous and large falls were infrequent.

32966 (SAND—82-2355, pp 115-122) **Status of geotechnical studies at the Texas A and M University in situ gasification trials.** Hoskins, E.R.; Russell, J.E. (Texas A and M Univ., College Station). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—). Contract FG22-80PC30221.

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

During the summer of 1980, an Underground Lignite Gasification (ULG) field test was performed to gasify lignite in a two-dimensional gas generator at the Alcoa/Rockdale Site in Milam County, Texas. The array consisted of 11 process wells arranged in a 60 x 60 ft square. Operational problems related primarily to well construction precluded generation of product gas with sufficiently high heat value for the test to be considered successful from a product quality view-point. However, insight was gained into the methodology for constructing inexpensive process wells which are capable of withstanding the stresses generated by high temperature operations. The scope of the geotechnical investigations made in conjunction with this test includes field, laboratory, and numerical modeling studies of the role of geotechnical parameters in the in situ gasification process. Topics studied include strength, deformation, permeability, and porosity of lignite seams and overburden materials, composition of overburden materials, regional and local geologic structure with particular emphasis on orientation of joints and faults and their relationship to strength, deformation, and hydrogeologic parameters, and the hydrologic regime. Primary geotechnical accomplishments to date are stratigraphic and lithologic characterization of the site and its environment of deposition, laboratory testing of overburden materials from unburned and burned areas, geophysical mapping studies at the site to attempt to find size, shape, and orientation of the cavities, and fracture mapping in the overburden and the coal seam.

32967 (SAND—82-2355, pp 147-156) **Directional drilling as a means of creating gasification flow paths in underground coal gasification.** Siegel, M.M. (Williams Brothers Engineering Co., Tulsa, OK); Chambers, C.C. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The technology of directional drilling has improved over the past ten years to the point that it is now a potentially economical method of creating communication between the bottoms of vertical wells in a coal seam for the purpose of facilitating underground coal gasification. An overview of state-of-the-art directional drilling technology and potential future developments are discussed as well as an estimate of the relative impact of drilling cost on the cost of product for various thicknesses and depths.

32968 (SAND—82-2355, pp 157-163) **Horizontal drilling for underground coal gasification.** Skonberg, E.R.; O'Donnell, H.W. (Baker Energy Resources Corp., Houston, TX). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Directional drilling of horizontal wells offers a reliable method of linking injection and production wells for underground

coal gasification. The technology and tools exist today to accurately and economically drill long horizontal wells from the surface. Special slant drilling rigs have been built expressly to drill long horizontal wells. These rigs have the capacity to drill out several thousand feet if necessary, and are designed for operational convenience even while drilling on a slant. Advances in downhole surveying systems allow for continuous monitoring of the drilled path which increases drilling accuracy over older, single or multishot systems. The slant or curved surface well can be drilled to horizontally intercept the coal seam, and the well can be reliably cased and cemented to prevent migration of gases. Once horizontal access to the coal is guaranteed, different well patterns can be selected and drilled horizontally through the coal seam. Several long horizontal wells can be drilled from one surface well by laterally displacing them, greatly reducing the cost per foot of horizontal hole in the coal. These horizontal wells can be intercepted with vertical wells along their length for the underground coal gasification process. These same drilling techniques can also be used in a dipping coal seam.

32969 (SAND—82-2355, pp 179-188) **Results and post-burn evaluation of TAMU's 1980 ULG field test in east Texas lignite, Rockdale site.** Brimhall, R.M. (Texas A and M Univ., College Station). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

During the summer of 1980 an Underground Lignite Gasification (ULG) field test was done by the Petroleum Engineering Department of Texas A and M University. This experiment was an attempt to gasify lignite in a two-dimensional gas generator at the Alcoa/Rockdale Site in Milam County, Texas. The array consisted of 11 process wells arranged in a 60 x 60 feet square. Operational problems related primarily to well construction precluded generation of product gas with sufficiently high heat value for the test to be considered successful from a product quality viewpoint. However, insight was gained into the methodology for constructing inexpensive process wells which are capable of withstanding the stresses generated by high temperature operations. Preliminary evidence suggests that reverse burn linkage channels occurred at, or near, the top of the seam even though efforts were made to propagate linkage paths at the bottom. Also, linkage channels did not occur in-line between wells as intended by design and by operations.

32970 (SAND—82-2355, pp 189-203) **Major problems, first results and projects of underground gasification of deep coal in France.** Gadelle, C. (Institut Francais du Petrole, Rueil-Malmaison, France); Sarda, J.P.; Pottier, M.; Ternot, A.; Raffoux, J.F.; Solety, P. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The aim of the Study Group on Underground Gasification of Coal in France is to develop and master the gasification of deep coal reserves (1000 m or more) that cannot be extracted either technically or economically using conventional mining methods. The main problem to be solved is related to the very low permeability of deep lying coal; the creation of artificial linking between the injection and production wells is required. Hydraulic fracturing is the method used at the present time; laboratory studies and in situ experiments are being undertaken in order to determine with a greater degree of accuracy the possibility of applying electrolinking; directional drilling in the coal seam would appear to have an encouraging future. Experiments are being carried out in the laboratory with in situ pilot tests and on models in order to define the procedure for achieving gasification. The problems related to self-ignition of coal and achieving reverse combustion have been sought out. The various studies undertaken should point out the factors that may affect the produced gas quality or the amount of burn coal between two wells. All the elements acquired from the studied must ultimately provide the criteria for choosing a site for the gasification. Knowledge of a site's natural conditions is therefore of prime importance in order to make the decision and choose the working method. Characterization of the site can be achieved with today's available prospecting techniques, such as coring, well logging, and surface geophysics. A description is supplied of the pilot project for underground coal gasification which is now underway in Northern France (Haute-Deule site). Allusion is made to the prospects for the future.

32971 (SAND—82-2355, pp 205-212) **Status of the Rawlins UCG-SDB program.** Davis, B.E.; Ahner, P.F.; Covell, J.; Singleton, A.H. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The second test in the Rawlins UCG-SDB program was completed in November of 1981 and completed the field test program by Gulf under DOE funding. All of the defined objectives were met during the 67-day steam/oxygen test which consumed 8500 tons of coal producing a gas with an average heating value of 335 Btu/SCF. Post test monitoring has detected a thermal front moving through the overburden but no additional movement of strata has been detected as of June 1982. Correlations between product composition and input variables have been established. The oxygen utilization was much better than expected and compares favorably with surface gasifiers.

32972 (SAND—82-2355, pp 213-219) **Economic comparison for UCG processes.** Bruggink, P.R.; Davis, B.E. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—). Contract AC20-77ET13108.

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The results of the Rawlins T-2 field test of underground gasification of steeply dipping coal have been used as the basis for an economic analysis of the manufacture of fuel products. In addition, a preliminary comparison has been made of the relative economics of the underground gasification of steeply dipping vs horizontal beds. Finally, the results of this analysis have been related to the economics predicted on site during the field test. Preliminary process designs and cost estimates have been developed for conceptual commercial plants to manufacture MHV gas, methanol, M-gasoline, and SNG from the underground gasification of approximately 3800 T/D of coal in both steeply dipping and horizontal beds. Product costs for the most favorable cases for each type of coal seam, including 12% DCF rate of return, are given. The lower costs for the steeply dipping bed cases are due to the significantly better oxygen utilization and higher methane content of the product gas that were observed experimentally during the Rawlins T-2 test. Steeply dipping bed process parameters examined separately (steam/oxygen ratio and well spacing) have little impact on product costs. Finally, the costs are higher than those predicted by the on-site economics model because of the present assumptions of a smaller commercial plant size, 1982 instead of 1981 costs, and lower operating pressure of the underground modules.

32973 (SAND—82-2355, pp 239-243) **Cleanup of UCG product gas.** James, H.R.; Smith, G.W. (Pritchard Corp., Kansas City, MO). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

This paper describes a conventional water wash process for cleaning raw UCG gas and identifies its disadvantages. It then describes a conceptual design using reductive incineration to clean raw UCG gas. A test program is discussed and an order-of-magnitude cost estimate is provided for a skid-mounted unit to test the use of reductive incineration to clean raw UCG gas. The three-step approach to the processing of UCG gas results in improved energy utilization. It eliminates the requirement of cooling the gas to remove contaminants, converts contaminants in the UCG gas into energy, and recovers the partial oxidation heat as steam for driving turbines. In addition, its use eliminates the need for pollution treatment facilities to separate condensed tar components from plant effluent water. Reductive incineration has not been tested on UCG gas. We believe that a test program could be easily undertaken using a small, skid-mounted facility. Specific objectives of the test program are: determine whether the partial oxidation process destroys catalyst poisons and hydrocarbons as predicted by the Pritchard computer models; determine the operating conditions

under which formation of COS and SO_2 in the reductive furnace is minimized and destruction of COS and SO_2 in the COS converter is maximized; confirm that carbon formation does not take place, or determine operating conditions under which carbon formation is minimized; determine the effect of volatile trace elements on the COS converter catalyst; and examine wear on burner orifices caused by particulates in gas.

32974 (SAND—82-2355, pp 245-259) **Assessment of underground coal gasification in bituminous coals.** Siegel, M.M. (Williams Brothers Engineering Co., Tulsa, OK); Mason, R.Z.; James, W.M.; Stewart, R.C.; Ives, W.; Beeson, R.J.; Mungen, R. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

This report describes the bituminous coal resources of the United States, identifies those resources which are potentially amenable to Underground Coal Gasification (UCG), identifies products and markets in the vicinity of selected target areas, identifies UCG concepts, describes the state of the art of UCG in bituminous coal, and presents three R and D programs for development of the technology to the point of commercial viability. Of the 670 billion tons of bituminous coal remaining in place as identified by the National Coal Resources Data System, 32.2 billion tons or 4.8% of the total are potentially amenable to UCG technology. The identified amenable resource was located in ten states: Alabama, Colorado, Illinois, Kentucky, New Mexico, Ohio, Oklahoma, Utah, Virginia, and West Virginia. The principal criteria which eliminated 87.3% of the resource was the minimum seam thickness (42 inches). The North-East-Central Census Region of the United States was identified as having the potentially greatest market for products of UCG. Power generation using gas turbines in either the cogeneration or combined cycle mode was determined to be the best application of low or medium Btu gas generated by UCG of bituminous coals. As a result of recent advances in directional drilling control technology and the likelihood of even more important in the near term, the open borehole concept was chosen as having the highest potential for successful application of UCG in bituminous coals. Three R and D programs were developed using three different concepts at two different sites. The study concludes that much of the historical information based on UCG in bituminous coals is not usable due to the poor siting of the early field tests and a lack of adequate diagnostic equipment.

32975 (SAND—82-2355, pp 261-267) **State of the Belgian-German experiment of underground gasification.** Ledent, P.; Beckervordersandforth, C.P.; Chandelle, V.; Fabry, R.; Li, T.K.; Sonntag, C. (Institution pour le Developpement de la Gazeification Souterraine rue du Chera, Liege, Belgium). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Since 1981 the Belgian-German experiment was continued with: well communication tests with nitrogen, start of reverse combustion, and assembly of gasification equipments. At the present time, the reverse combustion process is going on between the central well and one of the peripheric wells. The last results show that the flow properties between these two wells have been improved considerably. The experiment is being carried out at Thulin, near to the Belgian town Mons. Four wells, arranged in a star pattern, have intersected the seam Leopold-Charles at a depth of about 860 m. The seam itself, if it is tectonically undisturbed, has a thickness of about 6 m, and a summing up to coal thickness of about 4 m. The deposit is rather disturbed by alpino-type tectonics. The coal is a non-swelling coal with 11 to 13% of volatile matter. The permeability of the deposit was determined between 0.003 and 0.077 md by water acceptance tests and pressure fall off tests. The surface equipment for the reverse combustion operations has been designed and assembled in such a way that injection and recovery is possible on each well. The maximum pressure limit is 300 bar. The equipment to be used for the gasification process has been designed for a maximum pressure of 45 bar.

32976 (SAND—82-2355, pp 271-286) **Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion.** Advani, S.H.; Lee, J.K.; Min, O.K.; Lee, S. (Ohio State Univ., Columbus). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

A brief review of the state-of-the-art pertaining to roof collapse and subsidence modeling applicable to underground coal conversion (UCC) is given. The role of material properties and their temperature dependent sensitivity is discussed. Results from calibrative and field finite element model simulations of UCC are presented. In particular, numerical evaluations of Hanna II and Hoe Creek experiments are detailed along with selected comparisons. This paper details transient thermoelastic cavity and subsidence results obtained from a comprehensive finite element model formulation with changing boundaries. Numerical evalutions of Hanna II and Hoe Creek experiments are detailed. In addition, selected thermoviscoelastic response trends for the Hoe Creek II are identified. Temperature dependent properties are incorporated in all the simulations.

32977 (SAND—82-2355, pp 287-295) **Thermomechanical cavity growth modeling.** Glass, R.E. (Sandia National Labs., Albuquerque, NM). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The results of recent field tests, laboratory studies, and modeling efforts in UCG have indicated that the thermal and mechanical properties of coal may be the controlling parameters in determining initial cavity shape. In examining this possibility, laboratory efforts have been directed at determining temperature and bedding plane dependent properties of coal. A thermomechanical model which uses these properties has indicated that the cavity shapes seen at both the Hanna and Hoe Creek test sites result from the temperature dependent properties of the coal such as the coefficients of thermal expansion and the elastic moduli. The model determines stress levels and uses a simple bedding plane dependent stress failure mechanism to determine cavity growth. The decision to focus on the thermomechanical aspects of the problem was based on the need to predict not only relatively symmetric cavity growth such as seen during the Hanna 2 test, but also to predict asymmetric growth as seen at Hoe Creek 3. While it is recognized that other phenomena contribute to cavity growth, the calculations presented in this paper will demonstrate the utility of the thermomechanical approach. This paper also reviews the field and laboratory tests that led to the development of the model as well as the necessary thermomechanical properties of the coal.

32978 (SAND—82-2355, pp 297-305) **Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren).** Guntermann, K. (Aachen Univ. of Tech., Germany); Gudenau, H.W.; Mohtadi, M. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

A one-dimensional model to describe the UCC process was developed in connection with laboratory experiments. The calculations are based on the balances for energy and mass transport as well as the physical and chemical phenomena such as gasification reactions, pyrolysis and heat losses. The predicted results agree with the data from the laboratory tests. The purpose of the model is to find a control mechanism for the process. Variations of the model input parameters such as gasification agent flow rate and composition, pressure and heat losses were done to find optimum operating conditions. The physical and chemical processes involved in UCG, i.e., pyrolysis, gasification reactions, heat and mass transfer mechanism and heat losses can only be described by using assumptions and simplifications. These models require detailed knowledge of the phenomena and of some process parameters, i.e., local gas velocity, roof falling, which are not always completely available. This is why it is necessary to determine how to describe the process according to the goal of the modeling.

32979 (SAND—82-2355, pp 307-319) **Subsurface detection of retort gases from an underground coal gasification reactor in steeply dipping beds near Rawlins, Wyoming.** Jones, V.T.; Thune, H.W. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The soil-gas detection method offers a unique new technique for locating potential gas leakage areas before any significant migration avenues can develop. This approach has the advantage over atmospheric measurements because the soil gases are not greatly affected by winds and other varying meteorological conditions; therefore a much lower level anomaly may be resolved. One hundred and twenty-two, 18 foot deep permanent sites, based upon the local geology, were located and installed over the areas of both the previous Phase I and the current Phase II retorts. All sites were routinely monitored for methane, ethane, propane, i-butane, n-butane, ethylene, propylene, helium, hydrogen, carbon dioxide and carbon monoxide. Selected sites were periodically monitored for carbon disulphide, carbonyl sulphide, hydrogen sulphide and sulphur dioxide. The survey demonstrates that residual gases from the Phase I burn are still present in the near surface and product gases generated during the Phase II burn were clearly evident. Maps are presented showing the areal distribution of these products. Product gases migrated into the near surface, both vertically and laterally, along well developed cross-joints and near-strike joint sets within the sandstones stratigraphically above the coal seam being burned. Ambient air samples routinely taken near these well sites consistently had low values. It is concluded that a properly designed and operated UCG facility would not experience any adverse product gas leakage and would pose no hazard problems from either a safety or environmental point of view.

32980 (SAND—82-2355, pp 321-333) **Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test.** Levie, B.E. (Univ. of Colorado, Boulder); Krantz, W.B.; Gunn, R.D.; Youngberg, D. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—). Contract AS20-80LC10442.

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The spalling-enhanced-drilling model developed by Krantz, Camp and Gunn has been shown to predict quite well the water-influx data for the Hanna UCG field tests. In addition, Levie, Krantz, Camp, Gunna and Youngberg have used this model to predict the cavity shape for the Hanna II Phase II UCG field test which agrees well with the shape determined by post-burn coring studies. Furthermore, Gunn and Glaser have used the spalling-enhanced-drying model to show that the heat absorbed by the spalled rock accounts for the ten percent heat losses in the Hanna III field test which heretofore could not be explained. This paper presents cavity-shape predictions for the recently cored Hanna III UCG field test which provide additional confirmation of the validity of the spalling-enhanced-drying model. In addition, this paper discusses the mechanisms responsible for spalling.

32981 (SAND—82-2355, pp 335-344) **Comparison of forward combustion gasification models.** Kunselman, L.V.; Fausett, D.W.; Mones, C.G. (Laramie Energy Tech. Center, WY). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

A survey and comparison has been made of forward combustion gasification models that are available in the public domain. The models studied range in complexity from a simple constrained mass balance model to a two-dimensional unsteady-state model. The computer code for each model has been obtained and implemented on the University of Wyoming CDC CYBER 730/760 computer system. Analyses were computed with each of the programs using data (taken primarily from the LLNL data base) to simulate representative DOE sponsored field experiments at Hanna, Hoe Creek, Rawlins, and Pricetown. This study provides a direct comparison of input data requirements, computational capabilities, and computer time requirements for the various codes. It furnishes an indication of the applicability of each model to the various conditions occurring in the different field tests. As expected, the models compared in this survey vary greatly in predictive capability and computational expense. They also vary in the ease with which they can be applied to different field experiment data. The full comparison of these models is not yet complete; runs with representative steam injection field test data are planned and the causes of the failures of certain codes on certain field data sets should be determined. However, it seems clear that no single model is best in all situations. The type of information available for input; the type of information desired as output; type of computer available; the extent of user interaction with the code; and length of computer runs all influence the choice of an appropriate model code for a particular use. The information that has been provided on these factors should help in making such a decision.

32982 (SAND—82-2355, pp 377-387) **Study of the flame extinction process for coal under UCG conditions.** Massaquoi, J.G.M.; Riggs, J.B. (West Virginia Univ., Morgantown). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

A one-dimensional model of a burning coal surface has been used to study the mode of combustion and the flame extinction process under UCG conditions. This model considers a gas boundary layer, an ash layer, the char zone, a dried coal zone and the virgin coal in order to determine the temperature distribution and the linear burn rate from the coal properties and the bulk gas conditions. The model agrees well with the limited available experimental data. Under UCG conditions, the flame front is found to be located in the ash layer. As the system approaches flame extinction, the flame front moves toward the char/ash interface. The minimum oxygen concentration of the bulk gas required to maintain the flame is examined as a function of bulk gas temperature, ash layer thickness, and weight per cent water in the coal. Moreover, the model has the capability of determining the point at which flame extinction will occur. Therefore, this model can be used with other models (e.g., roof collapse model, oxygen transport model) to describe the cavity growth process during UCG. The study has shown the importance of oxygen transport in maintaining the combustion of wet coal during UCG. That is, if adequate oxygen transport is maintained to a burning coal surface, the system will retain ignition even if the bulk gas temperature drops to ambient conditions. The properties of the coal under combustion affect the point at which flame extinction will occur. For example, coals wih a lower water content can retain ignition at lower oxygen transport rates than coals with higher water content. Also, the ash content of the coal and the structural properties of this ash will determine the ash layer thickness and, therefore, will affect the point at which flame extinction occurs.

32983 (SAND—82-2355, pp 389-398) **Colorado lignite for underground coal gasification.** Soister, P. (Maverick Exploration Co., Englewood, CO). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Several billion tons of lignite occur in the Denver Basin a few miles east and southeast of Denver. Part of these resources are very favorably situated for underground coal gasification. Factors creating favorability are multiple and relatively thick continuous beds of lignite separated by mudstones, total coal thickness of sixty to eighty feet or more, no important aquifers present in the coal zone, horizontal bedding with no known faults or joints, beds mostly at depths of 250 to 1500 feet, a thick unconfined aquifer at the surface far above most lignite beds, gently rolling and sparsely populated rangeland forming the surface, and mostly private surface and coal ownership. Products from the gasification of this lignite should find ready markets in the rapidly growing communities along the east base of the Colorado Rockies. From Fort Collins on the north, through Denver and Colorado Springs to Pueblo on the south, the 1980 census showed a population of more than 2.1 million people. Most of this population is within 50 miles of potential UCG projects. It is expected that the population will almost double by the year 2000. Projected electrical power shortages, rapidly increasing natural gas prices, and serious high altitude air pollution all enhance the changes for products from UCG.

32984 (SAND—82-2355, pp 421-426) **Influence of pressure-swinging on the simulation of underground coal gasification.** Kurth, M.; Fuhrmann, F.; Guntermann, K.; Wenzel, W. (Aachen Univ. of Tech., Germany). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The simulation of underground gasification was carried out on compact coal blocks and on loose packed coal samples of 4 m length and 32 cm diameter in an autoclave plant. Three coal samples were gasified under constant pressue (cp) of 10 bar and four under pressure-swinging (ps) conditions between 7.5 and 12.5 bar. The pressure variation was achieved by closing and opening of the product gas valve. In all tests the same air mixture was used as gasification agent and the mass flowrates were constant. The main purpose of the test was to study the influence of pressure-swinging on mass and heat transport. The result showed an increase of the devolatilization and reduction zone by pressure-swinging conditions. The average gasification output was observed to increase by a factor of 2.7 in tests with compact coal blocks and more than three in tests with loose packed coal under pressure-swinging conditions.

32985 (SAND—82-2355, pp 429-447) **R and D program for UCG in bituminous coals.** James, W.M. (Williams Brothers Engineering Co., Tulsa, OK); Siegel, M.M.; Stewart, R.C.; Mason, R.Z.; Mungen, R. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

An R and D program for underground coal gasification (UCG) of bituminous coals has been developed for the Morgantown Energy Technology Center of the Department of Energy. The program focuses on open borehole from the surface by directional drilling as the primary vertical well linking method. Hydraulic fracturing and electrolinking-carbonization are also discussed. General concerns in UCG and concerns specific to bituminous coal are listed. The program proposed basic coal properties research, economic studies, and site development. A major preliminary field test design is presented which includes flowsheets, equipment and utility lists, material balances, and estimated costs.

32986 (SAND—82-2355, pp 449-456) **Site characterization: geophysical R and D needs.** Bartel, L.C. (Sandia National Labs., Albuquerque, NM). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Clearly the UCG process can be conducted without a thorough knowledge of the site characteristics; however, in order to optimize the process in both a research and commercial sense, an effort in site characterization would certainly be useful. This paper has attempted to identify some of the critical site characteristics, based upon current understanding of the process, and indicate possible areas where research and development might have the possibility of developing practical remote techniques. These remote techniques to be applied at the surface or in conjunction with a limited number of boreholes. The geologic features which affect the process include structure (faults, folds, fracture systems, etc.) permeability, porosity, water-bearing formations, rock strengths, and aquifers. In addition, several geophysical techniques have been identified which can and do give information to measure these geologic features. This paper focused upon the use of seismic reflection and refraction, electromagnetic, and gravity techniques. Several areas for improvement were noted. Generally, the area for improvement is connected with inversion of multiple data sets (seismic velocities, electrical resistivity, and density) to determine the parameters of interest. The geophysical techniques can be applied at the surface, surface-to-borehole, and cross-borehole. The lists of geologic features, coal features, geophysical techniques and areas for R and D are not intended to be complete, but are intended to initiate interest in these areas.

32987 (SAND—82-2355, pp 457-464) **Fundamental research needs in underground coal gasification.** Gunn, R.D. (Univ. of Wyoming, Laramie); Krantz, W.B. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The cost of field testing is extremely expensive. But, the cost of failed field tests is even greater. Consequently, in UCG there is a greater need for modeling, theoretical developments and laboratory experiments than in most other fields. Numerous past field test failures clearly demonstrate that reproducibility, predictability and consensus of opinion on UCG design can only be achieved with a thoroughly fundamental understanding of the process. After all, rockets were invented a thousand years ago but remained an interesting curiosity until the theoretical developments of the past 60 years. Without this theoretical knowledge, the man in the moon would still be a figment of fiction rather than a real astronaut making a giant leap for mankind.

32988 (SAND—82-2355, pp 475-478) **UCG-SDB, where do we go from here.** Graham, R.H.; Davis, B.E. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The DOE-funded Rawlins UCG-SDB program has proven successful. The technical feasibility of the process has now been demonstrated in the resource at Rawlins. The next step for commercializing this promising technology could include operation of a multimodule field test for a period of 1 year or more as an initial module for a small commercial plant. The final product at Rawlins must be determined based upon process economics and potential markets. Synthetic natural gas (SNG) appears to be appropriate as the earliest product form. There are several technical areas that will need to be further defined before design of a commercial facility is completed. In order to fully utilize the technology, transferability to other SDB resources must also be demonstrated.

32989 (SAND—82-2355, pp 479-485) **Shortest route to commercialization of UCG.** Paul, R.A. (Washington Irrigation and Development Co., Centralia). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

WIDCO's proposed approach to the commercialization of the UCG technology is presently being implemented in Western Washington State. The site selection and characterization phases were initiated in 1979, conducted by Sandia National Laboratories and financed by the US Department of Energy (DOE). These studies identified a site near the Centralia Coal Mine as that with the greatest potential for a successful UCG development. The studies indicated that this site did not contain any conditions which would preclude conducting a gasification test in the area. At the conclusions of the site selection and characterization phases, it was proposed that a field test, comparable in size to the Hanna and Hoe Creek series, be conducted at the Washington site. WIDCO, in turn, proposed that a series of laboratory and field tests be conducted first, and offered to provide project support. WIDCO's objectives were to determine the effect of the site specific parameters identified in the characterization phase of the UCG process and to identify the optimum design and operational parameters for future, larger scale tests. Based upon the successful completion and favorable results of the laboratory and field laboratory tests, WIDCO is proposing two additional field tests which should provide the technology necessary to design, install and operate the first commercial UCG module at their Washington State site. It is anticipated that the gas utilization associated with the second test will involve piping the product gas to the nearby Centralia Steam Electric Generating Facility to be burned as supplemental fuel.

32990 (SAND—82-2355, pp 489-498) **Comprehensive design and economic analysis of a commercial in situ coal gasification facility.** Whitman, D.L. (Univ. of Wyoming, Laramie); Humphrey, A.E.; Ruskan, R.P. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Engineering design and costing of a commercial in situ coal gasification plant have been completed and analyzed for economic viability. The plant is relatively small (1832 ton/day) compared to

surface-based coal conversion facilities resulting in significantly reduced capital expenditures. Based on the results of the economic analysis presented, financing for such a facility appears both feasible and warranted in spite of the current industry retreat from commercial synthetic fuels plants. The facility is designed to produce a synthesis gas for further upgrading to methanol, SNG, or Fischer-Tropsch liquids as well as to recover important byproducts such as carbon dioxide. The overall plant design is discussed and economic analyses are presented. The economic analyses presented are based on a total gross revenue approach with a choice of product combinations and selling prices to yield necessary revenues. This approach allows potential equity sponsors to analyze the economic results based on their individual expertise with particular product values and markets.

32901 (SAND—82-2355, pp 499-509) **Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study.** McCown, P.J.; Smith, G.W. (Pritchard Corp., Kansas City, MO). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

This paper describes the findings of a technical and economic feasibility and sensitivity study of using gas from an underground coal gasification (UCG) facility as feedstock for methanol synthesis with conversion to MTG gasoline. Three facility sizes are examined: 4000 bpd, 12,000 bpd, and 24,000 bpd of fuel grade methanol yielding varying rates of gasoline. Capital investment and operating costs are estimated for each underground coal gasifier and aboveground gas processing facility. In addition, use of gas from a lower thermal efficiency gasifier and production of hydrogen and carbon dioxide instead of methanol are examined. The paper also presents the findings of a sensitivity study showing the effects on product prices resulting from varying certain technical and economic parameters. Various capital investment structures are examined considering varying interest rates. Coal seam thickness, seam depth, coal heating value, resource recovery, gas leakage rate, royalty costs, and drilling costs are analyzed over a range of values. Raw gas costs are developed and methanol and MTG gasoline prices are calculated over a range of raw gas feed costs.

32902 (SAND—82-2355, pp 515-523) **Modeling studies of reverse combustion linking at high pressure.** Britten, J.A. (Univ. of Colorado, Boulder); Krantz, W.B.; Gunn, R.D. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

This paper applies the one-dimensional reverse combustion linking model of Kotowski and Gunn to high-pressure linking to subbituminous coal. This model then is coupled with the reverse-combustion stability model of Gunn and Krantz in order to predict reverse-combustion channel formation at high pressure. The model predictions are that increases in pressure cause lower average combustion temperatures, faster burning front rates, and a larger number of smaller diameter reverse-combustion links. An increase in the oxygen mole fraction causes smaller channel diameters and a larger number of channels; it may also increase the average flame temperature and combustion front velocity. The calculated properties of the reverse-combustion link are found to be very sensitive to the kinetic parameters in the rate expression for combustion of the volatile matter. The predicted trends are shown to be in qualitative agreement with recent laboratory and field test results.

32903 (SAND—82-2355, pp 525-534) **Prospects for laboratory simulation of UCG system phenomena.** Corlett, R.C. (Univ. of Washington, Seattle); Harloff, G.J. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

With the present state of knowledge, underground coal gasification (UCG) system behavior cannot be confidently calculated from first principles. Some matters of major concern, such as resource recovery and local collapse, are inherently geometric in nature and require experimental geometry similar to that of prototype systems. Recent two-well experiments with large blocks of reconstituted coal yielded open channel cavity shapes and gas compositions similar to those of typical field experiments. Problems due to excessive permeability were encountered. Steps for solving these problems are suggested. A permeability scaling rule is stated. Possible extensions of experimental simulation technique to encompass rubbling and cavity collapse are discussed. The immediate task is to achieve better understanding of block formulation so that relatively sophisticated simulation conditions can be met. It is concluded that laboratory simulation of system phenomena with reconstituted coal blocks should be developable into a cost-effective tool for UCG research and engineering. Of course, this tool will complement, rather than replace, mathematical models and pilot pre-commercial testing.

32904 (SAND—82-2355, pp 553-565) **Application of geological and mineralogical studies to underground coal gasification technology.** Burns, L.K. (Colorado State Univ., Fort Collins); Craig, G.N. II; Alexander, W.G.; Ethridge, F.G.; Laughter, T.; Youngberg, A.D. Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The results of studies on the geology, lithology and mineralogy of both the preburn overburden material and the pyrometamorphic products that formed from the overburden material can be applied to underground coal conversion technology. Studies on the preburn overburden lithologies may be used to suggest overburden control on several aspects of underground coal gasification. Studies on the postburn, pyrometamorphic products that formed during the experiments give estimates of temperatures attained during the experiments both in and around the reactor cavity of the experiments.

32905 (SAND—83-0057) **Process and technology development activities for in-situ coal gasification, FY 82.** Glass, R.E. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 54p. NTIS, PC A04/MF A01. Order Number DE83011863.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

As part of DOE's Underground Coal-Gasification program, activities at Sandia National Laboratories have been directed at Process and Technology Development. The project areas include (1) the development of a cornering water-jet drill for use in linking vertical wells in Underground Coal-Gasification (UCG) tests; (2) the development of a controlled-source audiofrequency magnetotelluric (CSAMT) surface geophysical technique for monitoring the process, and (3) the development of models for use in predicting the growth of the cavity. The accomplishments for the year include (1) the successful completion of the first phase of testing for the cornering water-jet drill, (2) the mapping of underground coal-mine fires and the Hanna II and Rawlins T-2 UCG test sites using the controlled-source audio-frequency magnetotelluric technique, and (3) the completion of a thermomechanical cavity-growth model.

32906 (UCRL—87611-Rev.2) **Large-block experiments in underground coal gasification.** Hill, R.W.; Thorsness, C.B. (Lawrence Livermore National Lab., CA (USA)). 30 Mar 1983. Contract W-7405-ENG-48. 11p. (CONF-820610—10-Rev.2). NTIS, PC A02/MF A01. Order Number DE83011228.

From American Institute of Chemical Engineers' spring meeting; Anaheim, CA, USA (8 Jun 1982).

The process of in situ coal gasification, while extremely simple in concept, is complicated in practice because, as the burn proceeds, the reacting volume is constantly changing geometry. In addition, the process takes place underground where it is extremely difficult to observe in detail. The five large block experiments described here were planned as a series of gasification experiments each of which was to be terminated at a fairly early stage of cavity development and examined by postburn excavation. The experiments included 1:1 and 3:1 steam:oxygen injection at two different flow-rate schedules, an air-injection burn, and a test of the controlled retracting injection point (CRIP) system. The results indicate that the underground coal gasification process at this location is insensitive to changes in steam:oxygen ratios or flow rate over the range used. The burn cavities were all mostly filled with rubble and thermally altered coal. 5 figures, 2 tables.

32997 **Assessment of materials and components performance at gasification pilot plants.** *Materials and Components in Fossil Energy Applications;* No. 43, 5-6(1 Apr 1983).

The materials and components successes and problems at the Bi-Gas Pilot Plant are summarized. Substitution of alloys reduced corrosion in some areas. Redesign of char burner and gas quenching system improved performance. Short service life of thermowells, coatings, valves, slurry pumps, etc. are still problems. (CKK)

32998 **Instrumentation for optimizing an underground coal gasification process.** Zielinski, R.E.; Seabaugh, P.W.; Agarwal, A.K. (Monsanto Research Corp., Miamisburg, OH). *Fossil Energy I and C Briefs;* 3: No. 5, 3-7(Sep 1982). Contract AC04-76DP00053.

The instrumentation and algorithms utilized for the Pricetown field test were proven to be effective. Since these were of modular design, they are directly applicable to a multi-module commercial UCG process. The further development of the global formalism used for the Pricetown field test can be accomplished in such a way as to allow for maximum and efficient control of the commerical UCG process. The UCG process, itself, produces a range of products that can be directly used or upgraded, however, proven instrumentation and control algorithms are required for maximum utilization of the coal resource and economic and efficient processing of the product. The instrumentation and control algorithms utilized at Pricetown can be effectively upgraded to support a commercial operation.

32999 **Synthesis gas production by the solar gas process.** Mathur, V.K.; Breault, R.W.; Lakshmanan, S.M. (Univ. of New Hampshire, Durham). *Energy Progress;* 2: No. 2, 91-95(Jun 1982). Contract AC02-79ET21067.

Carbonizaton experiments have been conducted in a batch fluidized-bed reactor at 823°K using 350 μ size sub-bituminous coal from the Montana Rosebud seam. The proximate and ultimate analyses are presented. This coal has been chosen as the feedstock for the first series of tests for its non-caking properties. Nitrogen, the fluidizing and heat-carrier medium, is preheated to 1223°K in an electric furnace simulating solar radiation and is supplied to the carbonizer at the rate of 0.033 m/min. The fluidized attains the required temperature of 823°K in 22 min. The coal is carbonized at 823°K for 30 min and the resulting char is then transferred from the carbonizer to the char receiver. The heat required for the carbonization if found to be 2185 Btu/lb. Most of the heat obtained from solar energy (in this case from the electrical heater) is transferred by the heat-carrier gas and is stored in the product gas as its calorific value and sensible heat. The products of carbonization are similar to those obtained in a conventional unit. 1 figure, 5 tables. (FR)

33000 **Corrosion behavior of materials in low- and medium-Btu coal-gasification environments.** Natesan, K. (Argonne National Lab., IL). pp 100-136 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

A state-of-the-art review is presented on the corrosion behavior of materials at elevated temperatures in low- and medium-Btu coal-gasification environments. The product gas composition from several dry-ash and slagging gasifiers have been used to calculate the oxygen and sulfur partial pressures in these systems as a function of temperature and feedstock type. Available information on the oxidation-sulfidation behavior of commercial engineering alloys and advanced materials exposed to mixed-gas atmospheres has been summarized. Regimes for corrosion protection via oxide formation on the materials are defined relative to alloy chemistry, oxygen and sulfur partial pressures in the gas environment, and temperature. 14 figures, 5 tables.

33001 **Erosion experience at the EDS coal liquefaction pilot plant.** Lendvai-Lintner, E.; Jones, J.P.; Sorell, G. (Exxon Research and Engineering Co., Florham Park, NJ). pp 155-178 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract FC05-77ET10069.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Materials performance at Exxon's 250 ton/day coal liquefaction pilot plant (ECLP) has been generally favorable, except for several instances of severe localized erosion. Overall erosion experience for ECLP is assessed based on inspection results from three turnarounds and on data from a comprehensive materials evaluation program. Specific erosion problems discussed in detail occurred in the vacuum stripper transfer line and vacuum stripper flash zone. Some general comments are made on the validity of using petroleum/petrochemical industry design guidelines for erosive services in coal liquefaction plants. The effect of velocity, solids concentration, and geometric factors on erosion resistance are discussed. Based on ECLP experience, broad conclusions applicable to EDS liquefaction equipment are presented. 11 figures, 2 tables.

33002 **Chlorine transport and corrosion mechanisms in coal liquids.** Judkins, R.R.; Keiser, J.R. (Oak Ridge National Lab., TN). pp 179-195 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract W-7405-ENG-26.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The use of high-chlorine coals as feed materials has resulted in severe corrosion of materials of construction of atmospheric-pressure fractionation columns in coal liquefaction pilot plants. We have developed mechanisms to describe the formation of the corrodent (HCl), its transport (as amine hydrochlorides) to the fractionation columns, and the corrosion process. The conditions necessary for the formation and transport of the corrodent and for the concentration of the corrodent in the fractionation columns are described. Methods by which the fractionation column corrosion may be controlled are proposed, and the properties of chlorine compounds in the coal liquids that make these control methods feasible are discussed. 2 figures, 3 tables.

33003 **Slurry erosion of materials.** Sargent, G.A.; Spencer, D.K.; Sagues, A.A. (Kentucky Univ., Lexington). pp 196-231 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Slurry erosion studies have been carried out using both alumina and coal particles in water, at angles of impingement from 30 to 90° and at velocities from 10 to 30 m/s. It was found that erosion rate, E/sub r/, could be described by a power law equation; E/sub r/ = kV/sup n/ where k is a constant and V the impact velocity. The exponent n was found to be about 1.6 for the alumina particles and about one of the coal particles. It was concluded that for the case of the alumina the erosion damage was related to the transfer of kinetic energy for the particle to the surface, whereas for the coal some of the particle kinetic energy was being used to create new surfaces as the coal particle broke on impact. It was also concluded that most of the erosion damage caused by coal particles was related to the mineral constitutents in the coal, particularly pyrite and quartz.

33004 **Mechanisms of corrosion and alloy response in coal liquid systems containing chlorides.** Sagues, A.A.; Davis, B.H. (Kentucky Univ., Lexington). pp 677-716 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Chloride-related corrosion in the distillation area has been recognized as a severe problem in the development of direct coal liquefaction plants. This paper reviews the chemical state of the corrosive chlorides, the nature of the corrosion reaction and the mechanisms of chloride transport within the process and the distillation area. The corrosion in areas handling wash water generated by corrosion protection steps is discussed and corrosion experiments on alloy response are described. Ammonia injection and materials selection appear to be viable solutions to wash water corrosion. The response of common engineering alloys to distillation column liquids containing various chloride levels has been investigated. A tendency for passive behavior of austenitic stainless steels is reported. 8 figures, 2 tables.

33005 **Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature.** Huang, T.T.; Toth, L.E.; Pfender, E. (Minnesota Univ., Minneapolis). pp 717-749 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Co-30Cr, Fe-30Cr, Ni-30Cr and Ni-50Cr alloys were studied in simulated coal gasification environments, containing hydrogen, hydrogen sulfide, water vapor and argon at 1173 K. These alloys form Cr_2O_3 on exposure to oxygen. The corrosion resistance of Cr_2O_3 formed on these alloys at different oxygen and sulfur activities were studied, using scanning auger microscopy, scanning electron microscopy, x-ray photoelectron spectroscopy and x-ray diffraction. The results indicate that sulfur can penetrate through Cr_2O_3 formed on NI- Fe- based alloys quite easily, but not through the oxide formed on Co-based alloys. On the other hand, Fe and Co ions can diffuse through Cr_2O_3 and this process can change the thermodynamic stability of Cr_2O_3 near the gas-oxide interface. Therefore, even in a gas mixture with low sulfur activity at which presumably only Cr_2O_3 is stable, chromium sulfide can form on the surface of Cr_2O_3. The Co-based alloys displayed the best corrosion resistance to low oxygen and high sulfur activity environments, but the sulfidation resistance of the Co-based alloys was greatly reduced when preoxidized in air due to the presence of cobalt in the chromium oxide. The effects of S as an impurity in the environment when Cr_2O_3 was formed are discussed with regard to its corrosion resistance, including the effects of different alloying elements. Different degradation modes of chromium oxide will also be addressed. 18 figures.

33006 **Erosion-corrosion of various alloys in a simulated coal gasification environment.** Verma, S.K.; Vesely, E.J. (IIT Research Inst., Chicago, IL). pp 750-798 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The erosion-corrosion environment that occurs in gasifiers is a combination of a severe high temperature oxidation-sulfidation condition augmented by an erosion component. The combined effect of this multimode type of attack on engineering alloys is being examined in two highly complex erosion-corrosion test units. A summary of the tests conducted so far is given, along with up-to-data results on a number of alloys. The specific effects of time, pressure, velocity, and the type of the erodent are also discussed. A limited amount of scanning electron microscopy has revealed the buildup of a corrosion product rich in Ca/Fe/Ni/S, irrespective of the alloy composition, which is thought to have originated from the erodent. This complex slag-like reaction product at the surface and the sulfide formed in the subscale have been found to affect erosion-corrosion significantly, and their influence on the overall reaction mechanism is discussed in this paper. 22 figures, 4 tables.

33007 **Effect of PFBC particulate on the high velocity erosion-corrosion of gas turbine materials.** Spriggs, D.R.; Brobst, R.P. (General Electric Co., Schenectady, NY). pp 799-831 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Erosion/corrosion testing has been performed in a ducted burner rig simulating a gas turbine and a pressurized fluidized bed coal combustor (PFBC). Flyash size distribution, velocity, temperature, and alkali sulfate contaminant level were varied. Erosion/corrosion degradation is evaluated on airfoil shaped specimens representing common gas turbine alloys, claddings and coatings including: IN-738 and FSX414 alloys, FeCrAlY (GE2541), CoCrAlY (PFB 6) and IN-671 (Ni-48Cr) claddings on In-738, and RT22 (pt-Cr-Al) coated IN-738. Recent studies have investigated PFBC particulate erosion at high velocities typical of turbine blading. Two tests have been performed at velocities of 357 and 345 meters/second (1170 and 1130 TPS) at 871°C and 738°C respectively. The tests each employed 85 to 100 ppM by weight PFBC flyash collected from the hot gas cleanup systems of the Exxon and CURL PFB facilities; no additional alkali sulfate was added. Significant findings from these tests were: (1) all materials tested exhibited metal recession, (2) at 871°C and 357 m/s, the coarser PFBC particle size distribution produced more erosion, (3) both Exxon and CURL particulate, without alkali sulfate additions to the flow, produced significant sulfidation of IN-738 at 871°C 4) and at 738°C, erosion was the predominant mode of degradation with little corrosion of the various materials. 22 figures.

33008 **Disposable catalyst for coal liquefaction.** Moroni, E.C. (Dept. of Energy, Washington, DC). *Energy Progress;* 1: No. 1-4, 22-23(Dec 1981).

Research efforts being carried out at various universities on use of disposable catalysts in a slurry phase in the SRC-II process for coal liquefaction are very briefly highlighted. Pyrite, a major constituent of coal mineral matter, has been found to greatly enhance coal liquefaction, and this finding should point out that radical changes are needed in coal cleaning processes prior to liquefaction so that only inert and detrimental minerals are removed and catalytic minerals are retained. Addition of certain transition metal-containing ores and metallic wastes has shown substantial effectiveness as coal liquefaction slurry catalysts. Materials containing Mo, Fe, Co, and Ni performed best. Currently high surface area metal sulfides are being synthesized. These materials will be tested as liquefaction slurry-phase catalysts. (BLM)

33009 **Coal slag-refractory compatibility studies: progress to date.** Kennedy, C.R. (Argonne National Lab., IL). *Ceramic Engineering and Science Proceedings;* 2: No. 11-12, 1156-1170(Nov-Dec 1981).

Approximately 60 different refractories have been exposed to both acidic and basic molten coal slags at temperatures between 1500° and 1600°C. A dense fused-cast chrome-spinel refractory has demonstrated superior resistance to corrosion by a wide variety of coal slags (CaO/SiO_2 = 0.2 - 1.7). Refractories containing > 30% chromia reacted with all types of slags to form complex spinel-reaction products. Alumina refractories were intermediate in performance in acidic slags and poor in basic slags. Magnesia-chrome refractories containing free MgO performed poorly in acidic slags but somewhat better in basic slags. Preferential dissolution of MgO was observed in all cases. 9 figures, 1 table.

33010 **Multihydrotorting of coal.** Tassoney, J.P.; Schlinger, W.G. US Patent 3,715,195. 6 Feb 1973. Filed date 30 Jun 1971. 7p.

Fuel gas comprising CO, H, and CH_4 is produced from solid carbonaceous fuels by a multihydrotorting process for increasing the conversion of coal into nonpolluting fuel gas. A pumpable coal-H_2O slurry having a solids content of 25 to 55 wt % in admixture with a stream of synthesis gas is passed through a tubular retort where it is heated 600 to 1300°F and .6 to 250 atm in the absence

of air. The raw coal is ground to particle size of 1/2 or 1/4 in. in diameter and carbonized in the retort. The volatile constituents in the slurry are removed and simultaneously hydrogenated in the process steam. The effluent from the tubular retort is introduced into the top of the fluidized bed while a 2nd stream of synthesis gas enters at its bottom. This intimate contacting and a 2nd hydrogenation of the process stream in the fluidized bed attains a temperature in the range of 1200 to 2000°F. Off-gas from the fluidized bed is cooled and purified to produce nonpolluting gas having a high heat value. Spent carbonaceous particles from the bottom of the fluidized bed retort and the separation zone are reacted by partial oxidation with steam and O in a free flow noncatalytic gas generator to produce the synthesis gas for use in the previous 2 hydrotorting steps.

33011 **Project Thunderbird: a nuclear trigger for coal gasification.** Wold, J.S.; Woodward, T.C. (Wold and Jenkins, Casper, WY). *Coal Age;* **72**: 64-65, 68(Sep 1967).

Use of nuclear explosions to facilitate utilization of coal, oil shale, and bituminous sand beds is reviewed, with particular attention to Project Thunderbird. A 100-mi² region of Wyoming, underlain by more than 20,000 million tons of coal, is the site for this in situ coal-energy experimental program. The total coal interval lies at a depth of from 1000 to 2200 ft and contains a gross section of coal that may be the thickest in the Western Hemisphere. In Project Thunderbird, a nuclear explosion will open up multiple seams and overcome some problems experienced in previous underground gasification experiments. A collapse chimney of 25 to 30% void space could be formed, which would be burned under controlled conditions. A 50-kiloton nuclear device at 2200 ft in the base of the Fort Union coal-bearing unit will give the following chimney characteristics; a rubble chimney of broken rock with a radius of about 127 ft and a height of around 35 ft; and approximately 2,000,000 tons of broken rock of which 25% (or 500,000 tons) is coal (a Btu equivalency of 1.5 million barrels of oil). Ignition of the broken coal and controlled injection of oxygen into the chimney will produce low-Btu gas and associated products.

0105 By-products

33012 **(SMAB—9) Fusion-reduction of iron combined with the production of methanol. Final report.** Brandberg, Aa. (SEE CODE- 9699465 Svensk Metanolutveckling AB, Stockholm). Feb 1981. 126p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750487.

Portions are illegible in microfiche products.

Considerable volumes of CO-rich off-gases are produced from a new iron ore reduction process. The manufacture of methanol from these off-gases has been studied. Only anthracitic coal can be used and the desulfurization of the primary iron is expensive. The recovery of the heat of the gas is difficult because of the formation of dust and particles and low sulphur coal must be used for additional power. A hypothetic case with effective off-gas purification and heat recovery with a pressurized reduction step gives a profit of 15 per cent of the investments. The price of methanol is then calculated to 1100 SEK per ton and iron to 625 SEK per ton. The combined manufacture of iron and methanol does not seem to motivate a development contribution in this case.

33013 **Theoretical studies of slag exchange equilibria.** Sabounji, M.L.; Blander, M. (Argonne National Lab., IL). *Canadian Metallurgical Quarterly;* **20**: No. 1, 31-36(1981).

Equations for the concentration dependence of slag exchange equilibria are deduced from the coordination cluster theory. The most important influence on this concentration dependence is preferential solvation of solute components by a solvent component. The linear concentration dependence of the logarithm of equilibrium quotients deduced by Flood and Grjotheim is valid for cases where there is essentially no preferential solvation and almost random mixing of solvent ions. Deviations fom the Flood-Grjotheim equation should be generally large for non-ideal slags in which one solvent component interacts more strongly with solutes than do the other solvent components. The equations derived in this work provide insights into the physical factors which influence the magnitude and concentration dependence of exchange equilibria.

0106 Properties

REFER ALSO TO CITATION(S) 32971, 32976, 32977, 32978, 32984, 32990, 33052, 33082, 33083, 33129

33014 **(BMFT-FB-T—83-009) Investigations on the influence of mineral matter of coals and cokes on the kinetics of gasification with hydrogen and water vapour.** Huettinger, K.J.; Krauss, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 126p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750866.

Portions are illegible in microfiche products.

The project was concerned with possible catalytic influences of certain components of mineral matter of coals in gasification with hydrogen and water vapour. Reaction kinetic studies were performed using coals of different rank, pretreated and doped coals and model carbons of similar preparation. Pure hydrogen, hydrogen/water vapour - and inert gas/water vapour mixtures were used as gasifying agents, the pressure was varied between 0,1 and 2 MPa and the temperature range extended from 790 up to 1010°C. The studies were completed by elemental and element analyses and by studies with the aid of microanalytic methods. The investigations showed that a decisive catalytic effect only results from iron. The effect is so much pronounced, that it may control gasification with hydrogen and water vapour above 850°C. As a precondition, the iron disulphide minerals have to be reduced to the catalytically active metal. In water vapour gasification the gaseous atmosphere has to be adjusted in such a way that the iron is stable in the reduced state. Sulphur of organic origin in coals does lower but not prevent catalytic activity of iron. Alkaline- and especially earth alkaline metals can act as sulphur scavengers. In view of technical gasification processes it seems to be most promising to make use of the catalytic activity of iron in hydrogasification.

33015 **(DOE/FE/60181—2) Relationship of coal science to coal technology.** Schobert, H.H. (North Dakota Univ., Grand Forks (USA). Energy Research Center). 1983. Contract FC01-83FE60181. 24p. (CONF-830542—3). NTIS, PC A02/MF A01. Order Number DE83011444.

From 12. lignite conference; Grand Forks, ND, USA (18 May 1983).

The author, in his introduction, emphasizes fundamental research on coal composition and properties as vital to the solution of technical issues facing the utilization of low-rank coals. He then goes on to discuss the following: (1) issues in low-rank coal technology; (2) relationships between coal properties and coal utilization which cover coal moisture content and drying, ash fouling and slagging, syngas and hydrogen effectiveness studies, cross-cut of coal properties; (3) relationship between coal science and coal technology; and (4) a look to the future (a unified theory of ash behavior, chemicals from lignite). Under section (3) the following topics are discussed: central questions of coal science; a research program in coal science (coal geology, inorganic constitution, organic constitution, physical properties, reactivity); and coal science and technology. 10 tables. (ATT)

33016 **(USGS-OFR—78-901) Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming.** Hatch, J.R.; Affolter, R.H.; Farrow, R.A. (Geological Survey, Denver, CO (USA)). 1978. 29p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

During 1975, a continuous core (B-1) was taken through the uppermost 132.9 m of soil and rock underlying Buffalo, Wyoming. Of the 132.9 m of core collected, 48.4 m are coal and coaly and carbonaceous shale of the Wasatch Formation. Proximate and ultimate analyses and heat-of-combustion, air-dried-loss, forms-of-sulfur, free-swelling-index, and ash-fusion-temperature determinations on 12 samples representing 33.85 m of coal are listed in table 2. These analyses were provided by the US Bureau of Mines, Pittsburgh, PA. Analyses for ash content and for 32 major and minor oxides and trace elements in the laboratory ash (table 3) and analyses of seven trace elements in whole coal (table 4) for all 29 samples were provided by the US Geological Survey, Denver, CO.

Table 5 contains the data lited in table 3 converted to a whole-coal basis plus the whole-coal analyses listed in table 4. Twenty-seven additional elements not listed in tables 3, 4, and 5 were looked for but not found in amounts greater than their lower limits of detection (table 6). Unweighted statistical summaries of analytical data on the 19 coal samples in tables, 2, 3, and 5 are listed in tables 7, 8, and 9, respectively. For comparison, data summaries for other Powder River region coal samples are included. Analytical data on the 10 coal-associated shale samples in tables 2, 3, and 5 are summarized in tables 10 and 11. Data summaries for Nd in both coal and shale and for Mo and Pb in shale were not made, because they were detected in an insufficient number of samples to calculate meaningful statistics.

0108 Waste Management

REFER ALSO TO CITATION(S) 32954, 33061, 33088, 33954, 33960, 34398

33017 **(CBI-F—2-81) Hydration of fly ash cement and microstructure of fly ash cement pastes.** Shiyuan, H. (Cement- och Betonginstitutet, Stockholm (Sweden)). 1981. 74p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750469.

The strength development and hydration of fly ash cement and the influence of addition of gypsum on those were studied at normal and elevated temperatures. It was found that an addition of a proper amount of gypsum to fly ash cement could accelerate the pozzolanic reaction between CH and fly ash, and as a result, increase the strength of fly ash cement pastes after 28 days.

33018 (CONF-820418—, pp 470-487) **Evaluation of alternatives for treatment of PGDP steam plant fly ash.** Whinnery, W.N.; Bengoa, B.J.; Kuehn, R.G. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

The PGDP steam plant has two coal fired boilers. Ash from the boilers is vacuum fed into primary and secondary cyclones. The steam used in creating the vacuum for transfer of the fly ash is currently used in an air washer to scrub out residual fly ash particles entrained in the air. Potential problems created by the heavy solids loading of the fly ash slurry discharge necessitate the treatment of that solution or treatment of the fly ash particles exhausted from the secondary cyclone prior to the air washer. A material balance of the fly ash was developed and as a logical outgrowth of that study, a uranium in coal and fly ash material balance was completed. The definition of these problems, their impact, and an evaluation of viable alternatives will be presented.

33019 **(CONF-830617—5) Maintenance and reliability of utility flue-gas desulfurization: projections vs experience.** Doctor, R.D. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83011726.

From 76. annual meeting of the Air Pollution Control Association; Atlanta, GA, USA (19 Jun 1983).

The frequency and duration of power-plant shut-down attributable to flue-gas-desulfurization (FGD) system unavailabilities have been a serious concern since the introduction of these systems. Because of these concerns, 62 utility FGD systems representing eight different scrubber chemistries were surveyed in 1980 to provide both a rationale for organizing availability data and a predictive tool for analysis. Reported FGD system operating data were tested to determine their consistency and completeness; following the tests, major component and subsystem availabilities were determined. The calculated trends in FGD system availability are correlated with the inlet concentration of SO_2 and design scrubbing efficiency. The assumed SO_2-removal efficiency is 90%, as would be required by the current NSPS. The trends indicate that all the technologies exhibited high availability when used in low-sulfur-coal applications. As the coal sulfur content increases to 3.5% and the required removal efficiency increases, dual-alkali systems maintained system availabilities of 80% or higher, while the lime/limestone FGD systems showed marked declines in availability. The problems with water chemistry were apparently compounded by closed-water-loop operations, and exhibited availabilities much lower than those of the open-water-loop systems. Serious availability problems will occur in lime/limestone systems at utilities unless the systems are designed with a sufficient number of modules to accommodate forced outages. The Wellman-Lord system has an apparent advantage over lime/limestone systems for high-sulfur coals at high removal efficiencies. The system availability is interpreted as falling off at nearly the same rate as for dual-alkali systems, but at an availability lower by a constant factor. This may be attributed to the overall increased complexity of the system, especially the regeneration loop. (DMC)

33020 **(DOE/FE/15079—T2) Spray dryer/electron beam removal of SO_2 and NO/sub x/ from flue gas. First technical progress report, 1 October 1981-1 October 1982.** Helfritch, D.J. (Cottrell Environmental Science, Somerville, NJ (USA)). Nov 1982. Contract FC22-81FE15079. 18p. NTIS, PC A02/MF A01. Order Number DE83012403.

Portions are illegible in microfiche products.

The objective of this project is the pilot scale evaluation of SO_2 and NO/sub x/ removal from flue gas by means of a lime slurry spray dryer followed by electron beam treatment. Capital and operating costs of this technique have been determined and it has been shown to be cost effective. The pilot scale work will serve to verify the cost study assumptions and to provide design guidelines for commercial applications. The pilot scale system, consisting of a spray dryer, electron beam and fabric filter, will treat a flue gas slipstream from a 150 MW coal fired boiler. Parameters such as lime reactant rate and electron beam dosage will be varied, and SO_2 and NO/sub x/ removal will be monitored. It is expected that better than 90% removal of SO_2 and NO/sub x/ will be achieved with reasonable operating costs.

33021 **(DOE/PE/70019—T1) Regulation of solid wastes from coal-gasification and -liquefaction facilities: an analysis of Federal and selected state hazardous-waste management programs under RCRA.** McDonald, C.; Johnson, N. (Systems Consultants, Inc., Washington, DC (USA)). 31 Jan 1980. Contract AC01-79PE70019. 65p. NTIS, PC A04/MF A01. Order Number DE83012189.

Portions are illegible in microfiche products.

The most recent developments in Federal and State hazardous and solid-waste management programs are described with emphasis on the impact of these programs on coal-gasification and liquefaction facilities. The Resource Conservation and Recovery Act of 1976 (RCRA) calls for development and implementation of State solid waste management programs based upon minimum standards set by the Environmental Protection Agency (EPA). Many of these Federal regulations are not yet final, and the delay has caused some States to suspend development of their programs or to proceed without guidance from EPA. In addition, new coal gasification and liquefaction facilities have had to develop plans for disposal of their solid wastes while Federal and State regulations continue to evolve.

33022 **(EPRI-CS—2897-Vol.1) Proceedings: symposium on flue gas desulfurization. Volume 1.** Ayer, F.A. (comp.). (Research Triangle Inst., Research Triangle Park, NC (USA)). Mar 1983. 444p. (CONF-820551—Vol.1). NTIS, PC A19/MF A01. Order Number DE83901965.

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Portions are illegible in microfiche products.

These proceedings are of the Symposium on Flue Gas Desulfurization, held May 17 to 20, 1982, in Hollywood, Florida. The symposium was sponsored by EPA's Industrial Environmental Research Laboratory, located in Research Triangle Park, North Carolina, and the EPRI Coal Combustion Systems Division, located in Palo Alto, California. The objective of the symposium was to provide a forum for supplier, user, service, and regulatory groups to discuss the technical and regulatory aspects of SO_2 control. The primary emphasis was on progress in SO_2 control technology, recent experience, and test results, not on future plans. The organization of sessions was as follows: (day 1) opening session, materials of construction; (day 2) dual alkali, special studies (chemistry, continuous emission monitoring, characterization, etc.), evening panel on reliability and maintenance; (day 3) combined SO/sub x//NO/sub x/, limestone/organic acid, utility applications and by-products;

(day 4) dry flue gas desulfurization. Volume 1 contains 22 papers from Days 1, 2, and 3 plus abstracts from panel members. All papers have been abstracted and indexed for the Energy Data Base.

33023 (EPRI-CS—2897-Vol.1, pp 2-19) **Kilowatts from coal.** Elder, H.W. (Tennessee Valley Authority, Muscle Shoals, AL). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

An assessment of forecasts for electrical energy demand and the coal for power generation is presented. Some factors that influence coal use, including flue gas desulfurization (FGD) and alternative control technology, are discussed. Performance and reliability are more important than ever.

33024 (EPRI-CS—2897-Vol.1, pp 21-49) **Trends in commercial application of FGD technology.** Laseke, B.A. Jr.; Melia, M.T.; Bruck, N.G. (PEDCo Environmental, Inc., Cincinnati, OH). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

PEDCo Environmental, Inc., under contract to the US Environmental Protection Agency/Industrial Environmental Research Laboratory - Research Triangle Park, has been monitoring the status of utility flue gas desulfurization (FGD) since 1974. Information for this program is obtained by visits to plants having operational FGD systems and through periodic contacts with the owner/operator utilities, FGD system and equipment suppliers, design/engineering firms, research organizations, and regulatory agencies. The information collected in this program is stored in the Flue Gas Desulfurization Information System (FGDIS), which is a collection of computerized data base files containing descriptive, design, performance, and cost data for all the FGD systems identified in FGDIS. FGDIS has the dual capability of generating the quarterly survey report as well as permitting immediate access to the data files via remote terminal access. This latter feature allows private and government users to access directly FGDIS at any time in order to conduct custom-designed data analyses, examine detailed data that are too specific to be conveniently included in the quarterly report, or review information that has been loaded into the system but not yet published in the quarterly report. This paper summarizes the status of FGD technology as of January 1982 and highlights recent trends in process selection, design, costs, and performance of FGD systems. This discussion focuses on the logic and methodology used to store and retrieve this information in FGDIS. Particular attention is given to the structure diagram of FGDIS, individual data fields, and data access/manipulation procedures.

33025 (EPRI-CS—2897-Vol.1, pp 74-84) **Materials problem: operating a closed-loop limestone FGD system.** Froelich, D.A. (Burns and McDonnell Engineering Co., Kanasa City, MO); Ware, M.W. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The wet limestone closed-loop sulfur dioxide absorption systems for both units of the R.D. Morrow, Sr. Generating Plant have experienced significant failure in their corrosion-protection measures. Initial corrosive attack was evident in the absorber module and the inlet and outlet ductwork through the stack breeching. After inspector and supplier analyses, rubber lining replaced the protective polyester coating in the absorber modele. Hastelloy alloy G replaced the coatings in the ductwork. After operations had been resumed for a few months, the rubber lining appeared satisfactory. The alloy G, however, was showing signs of failure, especially in the mixing zone and the stack breeching. Further testing and analysis were performed. Attention was turned to Hastelloy alloy C-276. This alloy had been a corrosion-resistor as a weld material for the alloy G cladding. It was decided to reclad selected areas of the ductwork and absorber inlet nozzle with alloy C-276. After a short period of operation, some of these areas also exhibited corrosive attack. Because of the alloy problems, various coatings were considered and installed over those areas of Hastelloy alloy G showing the worst corrosive attack. This coatings program found that an epoxy and some of the fluoroelastomers provided some substantive protection. Further coatings testing is underway in a program sponsored by EPRI. This program will also evaluate again selected alloys. 2 figures, 2 tables.

33026 (EPRI-CS—2897-Vol.1, pp 85-114) **Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment.** Renoud, W.J.; Lewandowski, R.J. (Fiberglass Structural Engineering, Inc., Bellingham, WA). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Fiberglass Reinforced Plastics (FRP) have proven extremely successful over the last thirty years as a material of construction for large, self-supporting structures that contain acidic liquids and gases. Recently, the first coal-fired powr generation plant FRP chimney liner, located at Maysville, Kentucky, was found to have an advanced corrosion problem and be in need of an immediate and extensive repair program. This paper discusses why the problem developed, what was done by the power company to correct the damage, and what was done to alter the corrosion and monitor future FRP chimney liner acceptability for service as a corrosion resistant structure. FRP applications to flue gas desulfurization in general will be considered. Also, methods will be examined by which these applications can be evaluated and equipment put into service and maintained. Issues such as FRP's ability to resist fire, corrosion, and support loads for long periods of time wil be considered. In addition, the power plant owner's level of involvement in design, specification, and construction inspection to adequately assure equipment success will be considered. 6 figures.

33027 (EPRI-CS—2897-Vol.1, pp 115-121) **Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station.** Grant, R.J.; Simpson, J.L. (Central Illinois Public Service Co., Springfield). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The presentation will include a brief history of the Company's Newton Power Station, the selection and design of the dual alkali flue gas desulfurization system and an explanation of the process. The presentation, accompanied by slides, will discuss some of the problems experienced, the materials used in the system, modifications which have been made, operating and maintenance costs, and system performance data.

33028 (EPRI-CS—2897-Vol.1, pp 122-140) **Laboratory and field evaluation of materials for flue gas desulfurization systems.** Koch, G.H.; Beavers, J.A. (Battelle Columbus Labs., OH). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Operating experience in coal-fired power plants has shown that corrosion and degradation of construction materials are major problems in maintaining flue gas desulfurization (FGD) systems. Battelle, in accordance with a request from the Electric Power Research Institute (EPRI), Palo Alto, California, has initiated work to identify the most critical components of FGD systems with respect to corrosion and degradation and to evaluate a wide range of alloys and lining materials for these components utilizing simulated and actual scrubber environments. Previous EPRI-funded work at Battelle aided in the identification of the critical components in FGD systems. This work included a documentation and analysis of utility experience with materials of construction for wet scrubbers, and a survey of the published literature on degradation of materials in FGD systems and in environments that are similar to those encountered in FGD systems. These data indicated that outlet ducts, stacks, prescrubbers, absorber inlets, and inline reheaters are most prone to materials degradation problems. Accordingly, the laboratory studies were performed under exposure conditions simulating the environments encountered in these components. Results of the laboratory studies indicate the comonly reported trends that alloys are more susceptible to corrosion, both uniform and pitting with increasing chloride concentration, up to 30,000 ppM, decreasing pH, and increasing temperature. To supplement the laboratory work,

field experiments were initiated to evaluate a wide range of alloys and linings in actual scrubber environments. The R.D. Morrow Sr. Power Plant near Hattiesburg, Mississippi, was selected as the site where studies in the mixing zone of the outlet duct will be performed. 5 figures, 7 tables.

33029 (EPRI-CS—2897-Vol.1, pp 141-148) **Materials of construction problems at Pleasants Power Station.** Cress, W.R.; Misner, T.L. (Allegheny Power Service Corp., Greensburg, PA). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Since preliminary operations began in 1978, there have been material failures in the ducts and in a chimney liner downstream of the scrubbers at Pleasants Power Station. This is our primary area of concern due to the extended outages that are required to replace these coating systems. In some duct areas we are already experiencing failures of our third attempt at finding materials suitable for this environment. Other material problems such as pumps and piping have been very minor. This paper summarizes the material behavior experiences at Pleasants after some three years and 20,000 hours of operations.

33030 (EPRI-CS—2897-Vol.1, pp 150-161) **Results of the Dowa technology tests at the Shawnee scrubber facility.** Hollinden, G.; Runyan, R.; Newton, S.; Garrison, F.; Pfeffer, S.; Smith, D. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Dowa process for SO_2 removal combines the benefits of solution scrubbing, the use of limestone, and the production of stable gypsum as the waste product. This report will discuss the results of the test program performed at the TVA test facility from January through April 1982. The objective of the test program was to demonstrate the operation of the Dowa process for sulfur dioxide removal from flue gas generated by a coal-fired boiler. A test program was conducted at Shawnee during 1979-1980 which demonstrated SO_2 absorption and regeneration of the scrubbing liquor, but there was insufficient time for long term reliability tests and there was no provision for the aluminum regeneration subsystem during this program. The current program was conducted after significant modifications and additions were made to the original system to improve operability and reliability and to insure that the program objectives would be met. The system has demonstrated the following performance: reliable, scale-free operation; 80% to 95% SO_2 removal depending upon operating conditions; 100% utilization of limestone (1.0 stoichiometry - one mole limestone per mole of SO_2 removed); 80+% gypsum solids in filter cake; 0.06 weight percent or less aluminum in the filter cake; efficient mist eliminator operation with minimal wash requirements. Typical startup problems affected initial reliability of the system. The nature of the problems experienced and their solutions are discussed. 1 figue.

33031 (EPRI-CS—2897-Vol.1, pp 162-182) **Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company.** Kaplan, N. (Environmental Protection Agency, Research Triangle Park, NC); Gibson, E.D.; Woodland, L.R. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper summarizes results from the recently completed full-scale demonstration program of the dual alkali FGD system at Louisville Gas and Electric Company's (LG and E's) Cane Run Unit 6. The demonstration program included a 12-day acceptance test, an official demonstration period of 13 months, and 4 additional months of system monitoring and instrument calibration. The FGD system designer offered LG and E seven process performance guarantees applying to: SO_2 emissions, particulate matter emissions, lime consumption, soda ash consumption, power consumption, waste solids properties, and system availability. All performance guarantees were met during the demonstration program except waste solids properties and soda ash consumption. These two guarantees were not met primarily because of problems related to operation of the vacuum filters. (However, the soda ash consumption guarantee was met during the 12-day acceptance test.) SO_2 removal averaged 91.6% during both the 13-month demonstration period and the 12-day acceptance test. Monthly performance parameters were applied throughout the 13-month demonstration period to characterize system operation. FGD system availability and utilization were 93.23% and 77.42%, respectively; system reliability was 94.06%, and operability was 94.01%. 2 figures, 8 tables.

33032 (EPRI-CS—2897-Vol.1, pp 183-200) **Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility.** Francis, D.V. (ARCO Chemical Co., Monaca, PA); Biolchini, R.J.; Coons, J.D. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper presents an operational review of the Double Alkali flue gas desulfurization system at an ARCO Chemical facility in Monaca, Pennsylvania. The FGD system was retrofitted to three pulverized coal-fired boilers burning high-sulfur coal (2.5 to 3.5%). The review discusses alternatives considered during the selection process, the system design, performance test results, system operations, and system availability. The system has met the Pennsylvania Department of Environmental Resources Emission requirements of 0.75 lbs SO_2/MM Btu and has met all the contract performance guarantees. Performance tests have demonstrated collection efficiencies up to 93%. During the past year, system availability has been above 97%. The filter cake which is mixed with fly ash to obtain a stabilized waste product has been easily handled, and landfill management results have proven better than anticipated. 14 figures, 2 tables.

33033 (EPRI-CS—2897-Vol.1, pp 255-268) **FGD chemistry and water integration.** Stewart, D.A. (Electric Power Research Inst., Palo Alto, CA); Hargrove, O.W. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The electric utility industry is interested in power plant water management to both conserve water and reduce waste water discharge to a minimum. For those power plants operating flue gas desulfurization (FGD) systems, the water management becomes more complex, but utilization of waste water in the FGD system is possible. Calculations of the effects of the various waste water streams on operation of lime and limestone wet scrubbing processes have shown that in many cases the SO_2 removal is enhanced by using these streams as makeup water to the system. The results of calculations using various combinations of makeup water, reagents, and flue gas compositions are given in this paper. 7 tables.

33034 (EPRI-CS—2897-Vol.1, pp 284-312) **Full-scale utility flue gas desulfurization system characterization results.** Rhudy, R.G. (Electric Power Research Inst., Palo Alto, CA); Morgan, W.E.; Smith, E.O.; Lowell, P.S. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Electric Power Research Institute (EPRI) initiated a full-scale flue gas desulfurization characterization project to provide data which will assist electric utilities in optimizing the operation of existing wet scrubber systems, aid in the selection of new scrubbing systems, and provide informed responses to possible new emission requirements. The project is directed at performing extensive and detailed evaluations of the emission control capabilities of selected, representative, currently operating, full-scale wet scrubbing systems. The scrubber systems that have been characterized are Columbus and Southern Ohio Electric Company's Conesville Unit 5 and Montana Power Company's Colstrip Unit 2. The selected scrubber systems were characterized by field testing and engineering analysis. Measurements were performed for currently regulated emissions as well as several unregulated emissions in the gas, liquid, and solid streams of the scrubber systems. Sulfur dioxide, nitrogen oxides, particulate, fine particulate, trace elements, particulate size-segregated trace element distributions, sulfuric acid mist, chlorides, fluorides, organics, carbon dioxide, and carbon monoxide were measured in scrubber influent and effluent streams. In addition, mist eliminator performance, scrubber generated particulate, and scrub-

ber sludge measurements were performed. These measurements, combined with scrubber process chemistry information, operating data, and design characteristics, provide a detailed understanding of the performance of the scrubber systems. Material balances and other techniques for establishing data consistency and reasonableness were applied in an effort to identify the limitations and quality of the data collected. Areas where potential improvements in scrubber operations could be made are identified. 7 figures, 8 tables.

33035 (EPRI-CS—2897-Vol.1, pp 320-340) **SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan.** Ando, J. (Chou Univ., Tokyo, Japan). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Combined SO/sub x/ and NO/sub x/ removal from flue gas from coal combustion has become more and more important with the increase of coal-fired boilers. Stringent regulations in Japan necessitate the combined removal even for flue gas containing about 200 ppM each of SO/sub x/ and NO/sub x/ derived from controlled combustion of low-sulfur coal. Flue gas cleaning, including selective catalytic reduction (SCR) of NO/sub x/, electrostatic precipitation, and the wet limestone-gypsum flue gas desulfurization (FGD) process, has been applied successfully to three coal-fired boilers, removing 50 to 85% of NO/sub x/, 99.9 to 99.95% of particulates, and 90 to 95% of SO_2. Thirteen similar cleaning plants are under construction for coal-fired boilers. Ammonia at the SCR reactor outlet is maintained below 5 ppM so as to give no adverse effect on FGD and the quality of fly ash, although wastewater treatment to remove ammonia may be required in certain regions. Cost of SCR is about one-third that of FGD by the limestone-gypsum process in both investment and operation. The power generation cost, including the flue gas cleaning and wastewater treatment, is less than that with low-sulfur oil without flue gas cleaning. The development of the combined cleaning system for coal has contributed significantly to save oil and to solve the energy problem in Japan. Simultaneous SO/sub x/ and NO/sub x/ removal by the electron beam and activated carbon processes has been tested. 6 figures, 11 tables.

33036 (EPRI-CS—2897-Vol.1, pp 359-374) **DOE's electron beam irradiation development program.** Trexler, E.C. (Dept. of Energy, Washington, DC). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Department of Energy's (DOE's) electron beam irradiation development program activities are conducted as part of the Advanced Environmental Control Technology (AECT) Program which is managed within the organization of the Assistant Secretary for Fossil Energy. The AECT program supports the development of cleanup systems to economically meet future emission limits so that the industrial and utility sectors can burn coal, which is abundant, rather than to burn premium fuels which are not. The Electron beam (E-Beam) development program seeks to promote the development of systems for the simultaneous removal of NO/sub x/, SO/sub x/, and particulates from such flue gas streams. Electrons pass through a thin window into the flue gas causing the conversion of gaseous NO/sub x/ and SO/sub x/ into new sulfur and nitrogen particulate compounds which are then removed by conventional means. The Primary R and D activities within DOE's program involve two jointly funded efforts with Avco-Everett/EBARA and Research-Cottrell. The High Voltage Engineering Corporation plays a prominent role as a subcontractor in both efforts. The Avco-Everett effort involves the testing of a configuration which utilizes ammonia injection upstream of the reactor and which produces a dry fertilizer by-product. The Research-Cottrell effort involves the testing of a configuration which utilizes a lime spray dryer upstream of the reactor and which produces a landfill waste product. An additional DOE E-Beam effort is being conducted at Florida State University where the use of electron irradiation for particulate precharing is being evaluated. 9 figues.

33037 (EPRI-CS—2897-Vol.1, pp 376-399) **Buffer additives for limestone scrubbing: a review of R and D results.** Rochelle, G.T. (Univ. of Texas, Austin). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper reviews results on testing of buffer additives from laboratory to commercial-scale. Adipic acid at concentration levels of 2 to 20 mM (284 to 2840 ppM) substantially enhances the performance (SO_2 removal/$CaCO_3$ utilization) of slurry scrubbers with or without forced oxidation. Such enhancement can be used to increase SO_2 removal, increase limestone utilization, and/or reduce liquid-to-gas ratio (L/G). Other organic acids such as dibasic waste acid have been shown to be equally effective. Organic acid makeup is required to replace losses resulting from solution entrainment in waste solids, coprecipitation in $CaSO_3$ solids, and oxidative degradation. Solution entrainment is minimized by dewatering waste solids; coprecipitation, by oxidation levels greater than 15%; and degradation, by lower pH with Mn present. Adipic acid and its degradation products introduce insignificant levels of toxicity to waste solids and present to additional environmental problems. The use of buffer additives adds a degree of freedom to scrubber operation that can be used to optimize cost while avoiding $CaSO_3$ scaling and other reliability problems. 7 figures, 5 tables.

33038 (EPRI-CS—2897-Vol.1, pp 400-424) **Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers.** Colley, J.D. (Radian Corp., Austin, TX); Hargrove, O.W.; Mobley, J.D. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

EPA's Industrial Environmental Research Laboratory at Research Triangle Park has conducted bench-, pilot-, and prototype-scale programs over the past several years to improve the performance of limestone flue gas desulfurization (FGD) systems. This paper describes the results of two demonstration-scale programs that were recently completed. Demonstration at a utility boiler FGD system was completed over a 9-month period (January-September 1981) at the Southwest Power Plant (SWPP) owned and operated by City Utilities of Springfield, MO. Natural and forced oxidation modes of operation were tested with both adipic acid and dibasic acid (DBA), a by-product of adipic acid manufacturing, used as buffers. The results of these programs show that the organic buffers substantially improve system performance. Also, the SWPP results could be predicted reasonably well from prototype-scale results which indicates that the prototype data base can be used effectively in the design of full-scale systems. Comparative economics for alternative methods of improving FGD system performance at SWPP indicate that DBA is the preferred choice for this system. Demonstration at an industrial boiler FGD system was completed over a 1-month period (spring 1981) at the Rickenbacker Air National Guard Base. The SO_2 removal efficiency with the adipic acid averaged 94.3 percent over a 30-day period. In a prior test using only limestone, the system averaged 65.8 percent removal. Economic calculations for an industrial boiler adipic acid enhanced limestone FGD system indicate a slight reduction in both capital and operating expenses relative to a limestone-only system designed for 90 percent SO_2 of 3.5 percent sulfur coal. The costs are competitive with the dual alkali system. The successful demonstration of the adipic acid enhanced limestone system increases the number of demonstrated technologies available to a potential user. 5 figures, 7 tables.

33039 (EPRI-CS—2897-Vol.1, pp 425-435) **Commercial application experience with organic acid addition at City Utilities of Springfield.** Hicks, N.D.; Fraley, D.M. (City Utilities, Springfield, MO). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

During 1981, Southwest Power Station participated with Radian Corporation and EPA in commercially testing adipic acid as an additive to enhance the effectiveness of its limestone flue gas desulfurization (FGD) system. After successfully demonstrating the effectiveness of adipic acid, a short test run was conducted using dibasic acids (DBA). Efforts were underway to develop a long-range improvement program to enhance the efficiency of the FGD system with the following options being considered: (1) increase the Liquid/Gas ratio of the recycled slurry in the TCA's; (2) convert

the TCA's to open spray towers and increase the L/G ratio; (3) utilize the TCA's (with stainless trays) in conjunction with the use of adipic acid; and (4) utilize DBA instead of adipic acid. In the final analysis, it was decided to use DBA with adipic as a backup system. Since December 1981, a temporary DBA storage and feed system has been in service. Because of the effects of cold weather on the crystallization of the material, handling problems have been encountered. But its effectiveness as a buffer in the limestone FGD system has been proven. A permanent material storage and feeding system is currently under design. 4 figures.

33040 (EPRI-CS—2897-Vol.2, pp 438-447) **Flue gas desulfurization operations at Apache Station.** Maurice, R.L. Jr. (Arizona Electric Power Cooperative, Inc., Cochise AZ). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The FGD system on the two coal-fired 195 MW units at Arizona Electric Power Cooperative's Apache Station, Cochise, Arizona, were commissioned in 1979. The system has proven to be relatively dependable approaching 100% reliability due to a completely redundant system. Start up problems, which are expected in a new system, were readily solved. The FGD system has shown 99.99% limestone utilization and 97% SO_2 removal efficiency for coal containing 0.45% sulfur. Installation costs were approximately 20 million dollars for the entire system, serving both Unit 2 and 3. Total energy requirements are 3000 KW. 1981 maintenance costs were $260,000.

33041 (EPRI-CS—2897-Vol.2, pp 448-468) **Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3.** Joos, D.W. (Black and Veatch Consulting Engineers, Kansas City, MO); Morgan, W.E.; Noblett, J.G. Jr.; Allen, C.D. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Compliance with sulfur dioxide emission regulations requires that a utility consider both the removal efficiency capability and reliability of the flue gas desulfurization (FGD) system. The State of New Mexico has recently established regulations that will require Arizona Public Service Company to meet both a 3-h emission standard and a minimum 72% sulfur dioxide removal efficiency on a 30-day rolling average basis. For Four Corners Units 1, 2, and 3, meeting these requirements involves an upgrade of the present FGD system, consisting of two wet venturi scrubbers per unit which were originally installed solely for particulate removal. The scrubbers are presently operated to remove both sulfur dioxide and particulate matter, using lime as the scrubber additive. This paper describes a Monte Carlo computer model which was used to simulate FGD system operation and reliability and to predict the magnitude of the required removal efficiency margin. The model produces probability distributions of 3-h average removal efficiency, daily average removal efficiency, 30-day rolling average removal efficiency, and non-compliance frequency for a given system arrangement and design removal efficiency. The paper also presents a technical evaluation and economic comparison of the retrofit alternatives available to increase the removal efficiency of the existing FGD system. A mass transfer model was developed to describe the removal of SO_2 in the venturi scrubbers for the various efficiency improvement options. The model was based on the results of scrubber performance test programs conducted at Four Corners Units 1, 2, and 3. The SO_2 removal efficiency improvement alternatives discussed include increasing the lime stoichiometry, supplementing the lime additive with magnesium, increasing the liquid-to-gas ratio, recycling ash pond decant water, and installing additional recycle sprays. 12 figures, 1 table.

33042 (EPRI-CS—2897-Vol.2, pp 492-508) **Summary of EPRI FGD sludge disposal research.** Golden, D.M. (Electric Power Research Inst., Palo Alto, CA). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper is a status report on the activities of the EPRI Solid By-Product Disposal Subprogram that relates specifically to FGD sludge disposal. The projects which are highlighted cover five subject areas as follows: (1) updating the disposal manuals; (2) site monitoring and modeling studies; (3) waste containment research; (4) dual alkali FGD waste disposal demonstration project; and (5) regulatory impact assessment studies. 8 tables.

33043 (EPRI-CS—2897-Vol.2, pp 509-525) **Utilization of FGD by-product gypsum.** Jenkins, S.D. (Tampa Electric Co., FL); Ellison, W. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Recently, many utilities have realized the advantages of forced oxidation in limestone-based FGD systems to produce gypsum in lieu of calcium sulfite. This paper describes the chemistry of the forced oxidation process and its advantages over other proesses. The characteristics and preparation of gypsum for landfill disposal or as raw material for commercial use are discussed. Some of these requirements have a significant effect on FGD wastewater management. Methods for minimizing these impacts are described. In addition, Tampa Electric Company's selection of a FGD system which is designed to produce commercial grade gypsum, and its work with future users of this by-product, are discussed. 1 table.

33044 (EPRI-CS—2897-Vol.2, pp 550-573) **Current status of dry SO_2 control systems.** Kelly, M.E. (Radian Corp., Austin, TX); Kilgroe, J.D.; Brna, T.G. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper provides an update on commercial applications and research and development (R and D) activities involving three dry SO_2 control technologies: spray drying, dry injection, and limestone injection in a multistage burner (LIMB) for combined SO_2 and NO/sub x/ control. Spray drying continues to be the only commercially applied dry flue gas desulfurization (FGD) process, although no new utility systems have been sold since mid-1981. To date, 13 commercial utility spray drying systems, totaling over 4000 MWe, have been sold. Two of these systems are currently operating: one is still experiencing start-up problems and the other is being used as a demonstration unit. There is also a full scale spray drying module (110 MWe) at a northern utility. This module has been used as a test unit by the utility and system vendor. In addition to the utility applications, there are eight industrial boiler spray drying systems, three of which are operational. Several of the utility and industrial systems are expected to start up in the next 2 years. At least two vendors and the Electric Power Research Institute are currently conducting demonstration-, pilot-, and laboratory-scale testing of the spray dryer FGD process. Two dry injection R and D programs are underway, but commercialization of the process still appears limited by uncertainities regarding sodium-based sorbent costs and availability. Development of the LIMB process is still in the relatively early stages. EPA is planning to continue development work in laboratory experiments, pilot-scale tests, and small commercial boiler tests. The LIMB process may be particularly suitable for retrofit applications, when compared to the more complex wet or dry FGD systems. 2 figures, 5 tables.

33045 (EPRI-CS—2897-Vol.2, pp 574-594) **Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal.** Samuel, E.A. (General Electric Environmental Services, Inc., Lebanon, PA); Lugar, T.W.; Lapp, D.E.; Fortune, O.F.; Brna, T.G.; Ostop, R.L. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Dry FGD by spray absorption with lime was evaluated in a 4.01-m^3/s (8500-cfm) pilot test facility for inlet SO_2 concentrations in the range 1000 to 4000 ppM (by volume), typical of flue gas derived from burning high sulfur eastern coals with sulfur contents in the range 1.5 to 5% (by mass). Flue gas for the pilot system was extracted isokinetically in a slipstream connected to the Unit 6 boiler at the Martin Drake Station operated by the City of Colora-

do Springs. As low sulfur (0.4 to 0.6%) Colorado bituminous coal is routinely burned at the Martin Drake Station, flue gas characteristic of high sulfur coal was simulated by injecting SO_2 and fly ash from high sulfur eastern bituminous coals to achieve representative SO_2 and fly ash concentrations at the inlet to the spray dryer. Fly ash from three different boiler types (cyclone, tangential, and stoker was evaluated for its effect on SO_2 removal under straight-through and wet recycle conditions. Overall SO_2 removal efficiencies of 90% or better with wet recycle and 80% or better with straight-through lime were observed. Specifically, at a lime feed rate corresponding to a stoichiometric ratio of 1.55 with an inlet SO_2 concentration of 3000 ppM, SO_2 removal efficiencies of 95% or better with wet recycle were achieved. SO_2 removal efficiencies better than 85% were achieved for straight-through lime operation under the same inlet condition. In addition, these results are compared with results obtained from earlier tests on SO_2 removal with dry injection of sodium compounds upstream of the pilot baghouse. 7 figures, 5 tables.

33046 (EPRI-CS—2897-Vol.2, pp 595-627) **EPRI spray drying pilot plant status and results.** Blythe, G.M. (Radian Corp., Austin, TX); Burke, J.M.; Kelly, M.E.; Rohlack, L.A.; Rhudy, R.G. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Electric Power Research Institute (EPRI) has initiated a one-year spray dryer/baghouse FGD pilot plant program at their Arapahoe test facility. The objective of the pilot plant program is to confirm the process capabilities and to provide the electric utility industry with reliable design and operating information for spray dryer-based FGD systems. The pilot spray dryer unit is rated at a nominal 9000 acfm, and has been designed with a great deal of flexibility in its configuration. The fabric filter unit is also flexible, having provisions for shake/deflate and/or reverse gas cleaning and having microprocessor controls which allow a great deal of versatility in cleaning. Fresh lime fed to the spray dryer pilot unit may be slaked in any of three slaker types. The pilot began operation in March 1982. Emphasis will be placed on slaked quicklime reagent, SO_2 removal efficiency in the 70 to 90% range, inlet SO_2 concentrations of 40 to 2000 ppM, and operation with sorbent/fly ash recycle. Results are preented for initial Na_2CO_3 tests. Because the time available is limited, it is important that potential sorbents and operating conditions are carefully screened prior to testing. Consequently, bench-scale spray dryer screening studies are also being conducted. To date, bench-scale testing with Mgo reagent has been completed. The results show that the reactivity of MgO reagent is greatly affected by calcining temperature, and perhaps the initial source of magnesium. Recycle of magnesium-based spray dryer product solids has been found to significantly improve sorbent utilization, but only when the recycled solids are ground in a ball mill rather than directly realurried. At low fresh feed reagent ratios, the most reactive MgO sorbent (calcined from $MgCo_3$) appears to perform nearly as well as once-through lime reagent. 14 figures, 6 tables.

33047 (EPRI-CS—2897-Vol.2, pp 628-649) **Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds.** Muzio, L.J. (KVB, Inc., Irvine, CA); Sonnichsen, T.W.; Hooper, R.G.; Green, G.P.; Brines, H.G.; Shah, N.D. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

A full-scale demonstration of the dry removal of SO_2 with sodium compounds was conducted at Public Service Company of Colorado's Cameo Unit No. 1. This is a 22 MW coal-fired boiler retrofitted with a fabric filter. The majority of the testing was done with nahcolite; limited testing was performed with trona and nahcolite from a different geological seam. In the dry SO_2 removal process, the sorbent is pulverized and injected into the flue gas stream ahead of the fabric filter. The dry sorbents were injected both downstream of the air preheater and into a higher temperature region in the preheater. The sorbent collects on the bags and the SO_2 is removed as the flue gas passes through the filter cake. The objectives of the program were: (1) to demonstrate the level of SO_2 removal attainable on a full-scale utility system under typical operating conditions, and (2) to assess the impact of nahcolite injection on the operation of the fabric filter. The test program demonstrated SO_2 removals of 75 to 83% with the injection of a stoichiometric amount of nahcolite into the flue gas. The rate of reaction between nahcolite and SO_2 was decreased when baghouse temperature was reduced from 30^{0}C to 250°F. This effect lessened the average SO_2 removal to nearly 40% when injecting near stoichiometric amounts. Injecting the nahcolite at a higher temperature region in the tubular air heater compensated for the decreased reaction rates at low baghouse temperatures. In addition to SO_2 removal, the dry injection of nahcolite also resulted in a simultaneous removal of nitric oxide on the order of 8 to 14%. For a comparable sodium injection rate, trona was not as effective in removing SO_2 as nahcolite. Dry sorbent injection had no substantial impact on the fabric filter operation. The rate of change in flange-to-flange pressure drop during filtration increased by about 20% during sorbent injection. 11 figures.

33048 (EPRI-CS—2897-Vol.2, pp 650-672) **Dry scrubbing at Northern States Power Company, Riverside Generating Plant.** Kaplan, S.M. (Niro Atomizer Inc., Columbia, MD); Chen, Y.J.; Hyde, R.C.; Sannes, C.A. Jr.; Skinner, M.F. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Initial operation of the 100 MW Riverside spray dryer absorption (SDA) system in conjunction with existing precipitators was accomplished in November 1980 with start-up of the retrofitted SDA/baghouse demonstration system occurring on March 12, 1981. The results of the testing conducted by Joy Manufacturing Company, Niro Atomizer Incorporated and Northern States Power Company during 1981 are presented in this paper. 14 figures, 9 tables.

33049 (EPRI-CS—2897-Vol.2, pp 673-688) **Atomization: the key to dry scrubbing at the Coyote Station.** Lewis, M.F. (Montana-Dakota Utilities Co., Beulah, ND); Gehri, D.C. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Coyote Station has been in operation for about one year. During that time, the two-stage, dry flue gas cleaning (FGC) system encountered various problems, most of which can be traced directly to poor atomization in the spray dryer. Rockwell International has made substantial progress in solving these problems since it took over full technical responsibility for the spray dryer performance in late 1981. This paper provides a history of the Coyote FGC System project from pre-contract testing in early 1977 to current status. The problems encountered over the last year are enumerated, and the solutions to those problems are discussed. Recent performance data for the system are presented and compared to guarantee and compliance requirements. These data illustrate that the FGC system performance has improved significantly since initial startup, and in fact, that the performance is consistent with predictions based on pilot testing. 11 figures, 1 table.

33050 (EPRI-CS—2897-Vol.2, pp 689-712) **SO_2 control with limestone in low NO/sub x/ systems: development status.** Drehmel, D.C.; Martin, G.B.; Abbott, J.H. (Environmental Protection Agency, Research Triangle Park, NC). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

During the late 1960's and early 1970's, the Environmental Protection Agency (EPA) and its predecessor organizations studied dry limestone injection as a method to control SO_2 from coal fired utility boilers. Because of high flame temperatures, limestone was calcined to a low reactivity and SO_2 control efficiencies were low. However, with the development of low NO/sub x/ systems for coal combustion, came lower flame temperatures and improved reactivity between limestone and sulfur species. Moreover, the reduced sulfur species which may be present in the low NO/sub x/ flame would be more reactive with limestone than SO_2. Conse-

quently, EPA is conducting research and development on the use of limestone for sulfur control in low NO/sub x/ systems to understand the means by which both NO/sub x/ and SO/sub x/ may be minimized simultaneously. The research and development program is directed at three different types of coal-fired furnaces: wall-fired, tangentially fired, and stoker-fired. The status of these three program areas is as follows. The wall-fired furnace program is well into the parametric study, and preliminary results are also available from the larger furnaces. The parametric study has identified coal firing rate, cooling rate, and sorbent injection velocity as most significant parameters. Optimum sorbent injection location depends on the scheme of combustion air addition. The tangentially fired furnace program has only just started; not even preliminary results are available. For both wall-fired and tangentially fired low NO/sub x/ furnaces, SO_2 capture of 40 to 60% is achievable. For stoker low NO/sub x/ furnaces, SO_2 capture with coal/limestone pellets can be as high as 80%. Causes for variability in performance are under extensive investigation. 11 figures, 2 tables.

33051 (EPRI-CS—2897-Vol.2, pp 714-733) **Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems.** Chang, J.C.S.; Dempsey, J.H. (Acurex Corp., Research Triangle Park, NC). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

Pilot plant (0.1 MW) evaluation of byproduct organic dibasic acids (DBA) as buffer additives to limestone scrubbers has shown performance improvements equivalent to those achieved by the addition of pure adipic acid. Both SO_2 removal efficiency and limestone utilization increased, and no significant operating problems were observed with three of the four DBA's tested. Chemical and biological evaluations of scrubber samples taken during the DBA testing indicated no detectable toxicity or mutagenicity, and no significant environmental impact is expected as a result of DBA additional. Economic estimates indicate that substitution of dBA for pure adipic acid as a buffer additive will result in additive cost savings of 40% or greater. 5 figures, 9 tables.

33052 (EPRI-CS—2897-Vol.2, pp 734-750) **Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience.** Donnelly, J.R. (A/S Niro Atomizer, Copenhagen, Denmark); Ellis, R.P.; Webster, W.C. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The first full sized utility spray dryer FGD system started up in December 1980 on Units 6 and 7 of Northern States Power Company's Riverside Generating Station in Minneapolis, Minnesota. During the first year of the demonstration test program, three different fuels were fired in the boilers: low sulfur coal plus petroleum coke (about 1.5% S); high sulfur coal (about 3.5% S); and low sulfur coal (about 0.8% S). Dry FGD end-products generated from these coals are handled in the same manner as fly ash from all of the station's units. The end-products are dampened in rotary unloaders, trucked to various sites and used as fill material. Samples of fly ash and dry FGD end-products were analyzed for chemical composition and tested for geotechnical properties related to landfilling. Tests included optimum moisture, compressive strengths and permeability. In addition, the EPA extraction procedure was used to generate leachates from the samples. This paper presents a description of the disposal system for the dry FGD wastes, the physical-chemical properties of the wastes, and results of the geotechnical investigations. Pelletizing tests performed on the low sulfur coal end-products are also described and pellet properties are given. 2 figures, 8 tables.

33053 (EPRI-CS—2897-Vol.2, pp 765-781) **Proven reagent for high sulfur coal flue gas desulfurization.** Henzel, D.S.; Stowe, D.H. (Dravo Lime Co., Pittsburgh, PA). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper reviews the commercial record of the Thiosorbic process application to high sulfur coals. The records shows that day in and day out compliance is currently being achieved by a number of wet SO_2 scrubbing control systems supplied by five different manufacturers that are achieving greater than 95% SO_2 removal across the absorbers. These SO_2 control units are located at utility plants in the Ohio River Valley and are proving that high sulfur coal can be burned successfully while maintaining clean air. The commercial plants using Thiosorbic's magnesium containing lime have experienced excellent operability records (in excess of 90%). In addition, most have been able to make modifications that have reduced design operating costs. As a result of the successful operation record, Thiosorbic lime is a recognized proven reagent for Flue Gas Desulfurization (FGD) of high sulfur coal. It is being utilized at 13 units representing approximately 700 MW of generating capacity. 3 figures, 7 tables.

33054 (EPRI-CS—2897-Vol.2, pp 782-796) **Simultaneous removal of SO_2 and particulates from flue gas.** Nelms, W.M. (ETURNEL, Inc., Scottsdale, AZ). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper describes the evolution and commercial application of a patented process for simultaneous removal of Sulfur Dioxide and Flyash in one step with a vertical venturi wet scrubber. Full scale tests were conducted at the Four Corners Power Plant for increased SO_2 removal by lime addition into a single stage, vertical venturi scrubber that was originally designed and installed for particulate removal only. To accomplish this, one of six existing scrubbers was isolated temporarily onto its own waste disposal system. Test objectives included: (1) the determination of SO_2 removal levels while injecting slurries of high calcium lime, and later, magnesium lime directly into the scrubber cone while maintaining high particulate removal; and (2) the improvement of operating conditions that would minimize scaling, erosion and corrosion. It was concluded that high levels of SO_2 removal are achievable with both high calcium lime (82% SO_2) removal) and with magnesium lime (92% SO_2 removal) while maintaining a particulate removal of 99.6%. Calcium sulfite hemihydrate was found to nucleate on flyash particles. Calcium sulfate concentrations decreased as a result of reduced overall system oxidation, allowing an essentially scale free operating system. The scrubber system of Units 1, 2, and 3 (575 MW capacity) at Four Corners was upgraded to incorporate this process and has been in commercial operation since November 1979. 8 figures.

33055 (EPRI-CS—2897-Vol.2, pp 797-801) **Heavy metals removal from double alkali waste: makes waste product usable.** Mulkey, M.A. (Vinings Chemical Co., Atlanta, GA). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

An efficient method has been developed for removing soluble heavy metal salts, suspended carbon and other insoluble compounds from double alkali wastes, making it possible to use the calcium sulfite waste as an agricultural soil conditioner. The FGD scrubber liquor is treated to eliminate contamination of the calcium precipitate. The treatment consists of preciptating the soluble heavy metal salts and filtering out the flocculants and insolubles. Some of the metals that can be significantly reduced include mercury, lead, nickel, and chromium. Of particular interest is the small volume of residual sludge, usually less than 0.1%.

33056 **(IVL-B—588) Technique for the purification of metal containing mining waters. Literature survey.** Ekengren, O. (Institutet foer Vatten- och Luftvaardsforskning, Stockholm (Sweden)). Dec 1980. 112p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750491.

Portions are illegible in microfiche products.

A summary over the metal content in waterstreams from 21 sulphidic non-ironous mines has been done. Zink and iron occur in the highest amounts. Further Ag, As, Ba, Cd, Cr, Cu, Hg, Mn, Pb, Se and W occur in various amounts. In a literature review the technical and economical aspects of the following treatment methods were studied: clarification ponds, hydroxide precipitation, sulphide precipitation, reverse osmosis (RO), electrolysis, ion exchange and

liquid-liquid extraction (VVX). The actual treatment methods of the water are clarification ponds and/or chemical precipitation. In spite of that the metal contents are sometimes high. RO, VVX and ion-exchange are only tested in laboratory- and pilot scale. Technical problems are reported. With commercial technics, electrolysis require a concentrated metal stream. The results of the calculations are vary. The calculations are based on laboratory experiments and the mining waters differ from each other in respect of pH and metal contents. In the report it is suggested that the laboratory experiments should be done with iron-sulphide precipitation. FeS-precipitation implies that the H_2S-formation can be controlled and that the sludge hopefully will be of an acceptable quality.

33057 **(KHM-TR—22) Formation and reduction of NO sub (x) and POM in coal firing.** Stroem, B. (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Apr 1982. 85p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750514.

The concept polycyclic organic materials (POM) is defined, and their properties are described. Measuring methods for nitrogen oxides and POM and mechanism of formation, are discussed. Methods for reduction of POM- and NO sub (x)-formation are discussed, and experiences from NO sub (x)-limiting measures in commercial plants are related.

33058 **(ORNL/MIT—361) Phenol degradation in a three-phase fluidized-bed bioreactor.** Richards, A.D.; Fricke, A.M.; Scott, J.E. (Massachusetts Inst. of Tech., Oak Ridge, TN (USA). School of Chemical Engineering Practice). Jun 1983. Contract W-7405-ENG-26. 61p. NTIS, PC A04/MF A01. Order Number DE83011765.

The operation of a three-phase fluidized-bed bioreactor for removing phenol from wastewater was studied. The reactor system consisted of a bacterial population (predominantly pseudomonads) attached to inert coal particles, which was fluidized by a stream of simulated wastewater containing approximately 0.1 g/L phenol. Oxygen was bubbled through the reactor to support the aerobic bacteria. The kinetics of phenol degradation by the attached organisms was investigated in batch shake-flask experiments. The rate of phenol degradation showed a first-order dependence on phenol concentration at high-oxygen concentrations (P/sub O_2/ = 1 atm) and a zero-order dependence on phenol at low-oxygen concentrations (P/sub O_2/ $\leq$ 0.2 atm). The kinetic data were well-described by a competitive inhibition model. The reactor was modeled as well-mixed with gas-liquid interfacial mass-transfer limitations. The model predicted an optimal value for the mass-transfer coefficient, above which oxygen inhibition reduces performance and below which mass-transfer limitations occur. Comparison of reactor operating data with model predictions showed that the liquid phase of the reactor was well-mixed and that the reaction rate was limited by the mass transfer of oxygen from the gaseous to the liquid phase. The mass-transfer component should be increased for more efficient reactor operation.

33059 (SAND—82-2355, pp 511-514) **Controlled burnout at an abandoned coal mine fire.** Chaiken, R.F. (Bureau of Mines, Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The Bureau of Mines is developing a new technique called burnout control that shows promise for controlling fires in abandoned coal mines and waste banks, and also for extracting the thermal energy represented by such wasted coals. The technique involves complete combustion of the coal in place (in situ) while maintaining total control of the resulting heat and fumes. The thermal energy produced and brought to the surface as high temperature gas (~ 1000°C) can be as much as 20 times the equivalent thermal energy required to operate the burnout control system. During burnout control, the burning waste bank or coal mine is placed under negative pressure relative to the atmosphere. Air flows into the underground combustion zone through natural fractures, crevices and porosity in the ground, and/or through specially drilled air inlet boreholes. An exhaust ventilation system, consisting in part of a large refractory lined borehole and fan then draws heat and the products of combustion from the fire zone, pulling them out at a single point. On January 4, 1982, continuous burnout control operations were initiated at the Bureau of Mines' Calamity Hollow Mine Fire Project, site of an abandoned shallow coal mine fire in the Pittsburgh seam. This field trial of burnout control lasted about 4 months after which time the fire zone (about 1 acre) was extinguished, the burnout control ventilation system was dismantled, and the fire area excavated and backfilled, recontoured and revegetated.

0109 Environmental Aspects

REFER ALSO TO CITATION(S) 32961, 32979, 33018, 33042, 33057, 33059, 34386, 34434

33060 **(CONF-8109216—Vol.1) Contact conference on acidification. Lectures.** (Statens Naturvaardsverk, Stockholm (Sweden); Ingenjoersvetenskapsakademien, Stockholm (Sweden); Institutet foer Vatten- och Luftvaardsforskning, Stockholm (Sweden); Centrala Driftledningen, Stockholm (Sweden); Sveriges Industrifoerbund, Stockholm). [nd]. 340p. (In Swedish). NTIS (US Sales Only), PC A15/MF A01. Order Number DE83750466.

From Contact conference on acidification; Joenkoeping, Sweden (15 Sep 1981).

Portions are illegible in microfiche products.

The conference lectures deal with causes of acidification in the environment and it's effects, possible measures against it, cost estimates and political actions needed. The acidification of both the terrestrial and aquatic environment is discussed, as well as the acidification of the ground water. Among the causes of acidification the interest is focused on air pollution. Possible measures include limits for sulfur in the fuel, combustion technology, flu gas desulfurization and measures in the recipients. Besides the cost estimates, are also coorision and health effects discussed. 26 lectures.

33061 (EPRI-CS—2897-Vol.2, pp 470-491) **Characterization and environmental evaluation of full-scale utility waste disposal sites.** Santhanam, C.J. (Arthur D. Little, Inc., Cambridge, MA); Cooper, C.B.; Balasco, A.A.; Jones, J.W. Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

This paper presents a status report as of March 1982 on the EPA project entitled Characterization and Environmental Evaluation of Full-Scale Utility Waste Disposal Sites. This project involves the characterization, environmental evaluation, and engineering/cost assessment of coal ash and flue gas desulfurization waste disposal at full-scale waste disposal sites. The project is designed to obtain technical background data and information so that EPA can determine the degree to which disposal of these wastes (from coal-fired power plants) needs to be managed in order to protect human health and the environment. An in-depth site selection process has resulted in the selection of six sites, representing a cross-section of waste types, disposal methods, and environmental settings (e.g., climate, soil type). These six sites have been developed for characterization and environmental evaluation; i.e., soil and waste borings have been made, and groundwater sampling wells have been put in place. Sampling/analysis and assessment efforts at the six site are currently underway. Preliminary evaluations of data from three of the sites have been completed. Attenuation of migration of chemical constituents by soil is significant at one of these sites. Data to date suggests that no major environmental effects have occurred at the sites. 8 tables.

33062 **(KHM-TR—16) Calculation of sulfur precipitation on a national scale.** Hoegstroem, U.;Swedman, A.S. . (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Dec 1981. 44p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750472.

Statistics from SCB (The Swedish Central Bureau of Statistics) have been used for calculating the sulphur emission for 1978. Investigations concerning the future fuel consumption of district heating plants and industry have been used as a basis for the years 1990 and 2000. Two alternativs for the supply of district heating in

the Uppsala and Stockholm regions have been included in the report - one alternative based on district heating supplied from Forsmark and the other based on the use of local hot water power plants and combined power and district heating plants. In addition, two alternatives for sulphur emission limits in conjunction with coal firing have been studied. In estimating the overall budget for sulphur precipitation of Sweden a comparison has been made with a study which covers the situation during the years 1971/72. The result of this comparison indicates that the total sulphure deposition during the period from 1971/72 to 1978 has increased by perhaps as much as 30 per cent. This increase is due to a considerable increase in the contributions from abroad - contributions from sources within Sweden have, on the other hand, decreased by about 30 per cent. The proportion of the sulphur precipitation over Sweden originating from Swedish sources amounted to scarcely 20 per cent in 1978 compared with 30 per cent in 1971/72. Consequently, despite the fact that the Swedish contribution decreased, the total precipitation increased. The tables present the precipitation broken down by source type for the various scenarious for a number of selected geographical locations. The total precipitation at present and for the various scenarious is also presented in map form.

33063 **(KHM-TR—17) Emission of mercury from an ash disposal.** Gaarding, M.; Svedberg, G.). (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Dec 1981. 55p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750471.

Portions are illegible in microfiche products.

Fly ash, bottom ash and slag are waste products left in large amounts after the burning coal. Flows of mercury are presented as an example representing an assumed coal consumption of 23,5 Mton/year at some time after the year 2000. In this example, the amount of mercury entering the combustion plants is 2400 kg/year, of which one half is emitted to the air and the other half is disposed of together with the coal ash. If nearly all of the mercury could be retained with the coal ash, the mercury concentration in the coal ash would be approximately 1ppm (= 1μg/g) for a mergury concentration in coal of 0.1 ppm (= 0.1μg/g). These values may be compared with the total amount of mercury annually emitted to the atmosphere in Sweden, which is 6500 kg. The concentration of mercury in sludge from municipal waste water treatment plant is 2-5 ppm, and the concentration of mercury in soils and sand is a factor 10-100 less than that. Results for retention of mercury in fabric filters are available, but they give no real equilibrium values. The data do not have such a quality that makes it possible to get a good estimation of the equilibrium concentration of mercury at ambient temperature. Depending on the adsorption energy chosen, values between 1 ng/^{3}m and 1000 ng/^{3}m may be achived. The flow of mercury from an ash disposal may be calculated if the concentration of mercury in the air just above the surface of the disposal is known. However, after some months it is probable that most of the mass transfer of mercury inside the disposal is very low. The emission rates for mercury from an ash disposal have been estimated for some extremly pessimistic assumptions.

33064 **(NP—3750477) Emission of sulfur from combustion of coal and oil. Report in response to supplementary instructions to the project Coal Health Environment.** (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Dec 1981. 75p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750477.

Portions are illegible in microfiche products.

The report comments on the Government bill suggesting that the sulfur emission at any Swedish combustion plant should be limited to not more than 1600 tons/year by 1988, and that coals with an average sulfur content exceeding 0.6 per cent should not be used. In the report, the technical solutions available for reducing sulfuremissions are reviewed (coal cleaning, combustion technologies, flue gas cleaning) as are the costs for meeting different emission standards. The present environmental situation concerning sulfur deposition is discussed and the propable changes due to the proposed regulations are outlined. The availability and prices of low sulfur coals are also treated.

33065 **(NP—3770053) Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany.** Kutscher, F.W. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 12 Dec 1980. 130p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770053.

Portions are illegible in microfiche products; Thesis.

Connections between soil movements and roads are clarified, measures for road construction and construction methods are deduced from these facts. First of all the troughtheory and road constructions are dealt with, then the influence of settling, slope, warping and changes in length are investigated into.

33066 (ORNL—5999, pp 31-47) **Environmental impacts program.** Hildebrand, S.G. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

Environmental Impacts Program (EIP) activities during this reporting period included (1) ecological input for environmental impact statements and assessments, (2) analysis of regional environmental information, (3) environmental risk analysis, (4) technical assistance in the development of guidelines for compliance with environmental legislation, (5) field research addressing methods for evaluating instream flow needs of aquatic biota, and (6) analysis of environmental issues related to nuclear waste. These activities continue to span a broad range of energy technologies including nuclear, geothermal, hydroelectric, synfuels, and biomass.

33067 **(ORNL/MIT—357) Thin-film evaporation of coal liquids.** Scott, J.E.; Derby, J.J. (Massachusetts Inst. of Tech., Oak Ridge, TN (USA). School of Chemical Engineering Practice). May 1983. Contract W-7405-ENG-26. 66p. NTIS, PC A04/MF A01. Order Number DE83011766.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Thin-film evaporation of coal liquids was experimentally studied and theoretically modelled to predict the effects of spills on waterways for three coal liquids - raw SRC-II, hydrotreated SRC-II, and H-Coal light distillate. Weight loss, phenolic concentrations, density, and boiling-point distribution were measured and predicted as functions of time, wind speed, film thickness, and liquid-pool size. The model predicted the weight loss of raw SRC-II coal liquid, hydrotreated SRC-II, and H-Coal light distillate within an average of 6, 23, and 80%, respectively, over a 48-h evaporation time. Thin films (1.8 mm) of coal liquids evaporated with the following weight losses: 34% for raw SRC-II; 60% for hydrotreated SRC-II; and 73% for H-Coal light distillate. The predicted boiling-point distribution was within an average of 20% of the measured distribution. Isothermality between the film and surrounding air was demonstrated by measuring the film and ambient temperature. Evaporation was predicted to be a weak function of pool size. The film thickness of the coal liquid did not significantly affect the rate of evaporation; this implies negligible liquid-phase, mass transfer resistance.

33068 (SAND—82-2355, pp 535-542) **Groundwater quality in underground coal gasification: a regulatory outlook.** Schmittdiel, P.M. (Dept. of Environmental Quality, Cheyenne, WY). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The paper has focused on two major areas of concern for groundwater quality in underground coal gasification: the problems associated with groundwater monitoring and the need for groundwater restoration. The first problem - groundwater monitoring - will be easier to overcome than the second. A well planned network of monitoring wells and strict adherence to recommended sampling procedures and methods of analysis should reduce the probability of poor or inadequate data. Regular (annual) quality control checks can increase the confidence in the data. The second concern for groundwater quality - restoration - requires additional

research in several areas including the following: the adsorptive capacity of the coal in an underground environment where the surface area is limited; the geochemical behavior (including delayed or complex time dependent reactions) of the major classes of organic compounds; the effects of temperature, pressure, gasifying agents, rank of coal and the hydrogeologic environment on the release of organic or inorganic compounds; other types of retardation mechanisms that may immobilize some of the organic contaminants in the groundwater system; and the development of active restoration methods that are cost effective and environmentally acceptable. The continuance of research in these areas should concentrate on the collection of field data to support the results of any laboratory studies and on relating the findings of their applicability to a larger scale project.

33069 (SAND—82-2355, pp 543-552) **Effect of UCG on groundwater: a study of cavity and surrounding groundwater.** Behi, A.M.; Ahner, P.F. (Gulf Research and Development Co., Pittsburgh, PA). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

An evaluation of the groundwater obtained both from the Rawlins No. 1 underground coal gasification (UCG) reactor and from nearby hydrology wells was conducted to determine the effects of UCG on groundwater. This study led to the following conclusions: (1) hydraulic communication between the G-seam coal and the overlying sandstone strata has occurred. (2) Phenol concentration in the wells surrounding the reactor increased during the test but quickly decreased to pretest levels in the post-test samples. The cavity water shows the lowest phenol content. This may be due in part to addition of drilling water to the cavity during post-test coring operations. (3) Minerals saturation indices calculated from the analytical data show that the cavity water is oversaturated with respect to gypsum while the nearby well water is saturated with respect to calcite and dolomite. This indicates that significant interactions are occurring between the cavity water and thermally altered minerals present in the cavity. (4) Analytical data on the cavity water indicate that, except for sulfate, all the significant parameters are either within pretest levels or lower.

33070 (UCRL—87650-Rev.1) **Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions.** Wang, F.T.; Mead, S.W.; Stuermer, D.H. (Lawrence Livermore National Lab., CA (USA)). 16 Apr 1983. Contract W-7405-ENG-48. 43p. (CONF-820610—7-Rev.1). NTIS, PC A03/MF A01. Order Number DE83012049.

From American Institute of Chemical Engineers' spring meeting; Anaheim, CA, USA (8 Jun 1982).

It has been shown that underground coal gasification (UCG) may introduce a broad range of residual gasification products into the groundwater of a coal aquifer. Sorption of many contaminants by the coal itself is an important factor in restricting the migration of these contaminants in the groundwater. However, our field studies at the Lawrence Livermore National Laboratory (LLNL) Hoe Creek site in northeastern Wyoming have shown that sorption of organic compounds by coal is not as effective as expected, perhaps because the coal surface area is limited. Furthermore, if severe roof collapse has taken place during gasification, non-coal aquifers located above the gasified coal seam may be interconnected with the coal aquifer. Contaminants may enter these non-coal aquifers, in which sorption is even less effective. The Hoe Creek II and III experiments have enabled us to study the contamination of a sand aquifer located above a gasified coal seam in a hydrological recharge area. Our preliminary results indicate that the water in the overlying sand aquifer is much less contaminated with organic compounds than that in the gasified coal aquifer. In conducting these field investigations, we have also learned valuable lessons concerning a strategy for groundwater monitoring. 21 figures.

0110 Reserves And Exploration

REFER ALSO TO CITATION(S) 32974, 32983, 32986

0120 Mining

REFER ALSO TO CITATION(S) 33059, 33099, 33159

33071 (ANL/EES-TM—217) **Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites.** Henning, R.J.; Bogner, J.E.; Henricks, J.D.; Vocke, R.W. (Argonne National Lab., IL (USA)). Dec 1982. Contract W-31-109-ENG-38. 228p. NTIS, PC A11/MF A01. Order Number DE83011914.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

As part of a program to examine the ability of existing control technologies to meet proposed federal guidelines for the quality of aqueous effluents from coal mines intensive studies of water, coal, and overburden chemistry were conducted at three surface mines in Pennsylvania from April 1976 through October 1977. Each of the three mines produced different coals of the Pennsylvanian-age Allgeheny Formation: PA-1, the Kittanning Coals; PA-2, the Upper Freeport Coal; and PA-3, the Upper and Lower Clarion Coals. Water sampling locations at each mine were chosen to include untreated pit water, the final effluent discharged to the receiving stream, and points in the receiving stream above and below the effluent discharge. Overburden analysis at the three mines indicated a net excess of neutralizers at PA-1 and PA-2 and a net deficiency of neutralizers at PA-3. At PA-1, effluent from the last pond showed reduced conductivity and alkalinity and lower levels of TSS, Fe, Mn, Mg, Ca, Al, Zn, Sr, Hg, Pb, Cd, and Co when compared to the alkali-treated effluent in the first pond. PA-2, which did not use an alkali treatment, was characterized by increases in concentrations of effluent-suspended solids as the mine drainage was pumped from the pit to a series of poorly defined settling ponds. Final effluent at PA-2 generally complied with federal standards for iron and pH but not for total suspended solids and manganese. At PA-3, alkali treatment and effluent retention in settling ponds were sporadic and generally ineffective in producing a final effluent that complied with federal standards.

33072 (DOE/ET/10023—4-Vol.1) **Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 1. Technical report.** (Raymond Kaiser Engineers, Inc., Oakland, CA (USA)). Feb 1983. Contract AC01-79ET10023. 260p. NTIS, PC A12/MF A01. Order Number DE83011344.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This is a report on Phase II of a proposed five-phase project to be performed with US Department of Energy support, entitled The Development of Optimal Terrace-Pit Coal-Mining Systems. Phase I of the project dealt with design and economic analysis of terrace-pit mining concepts for surface mining of coal and comparison of these systems with conventional mining scenarios. These comparisons were made for most of the major coal basins of the United States. Phase I included the publication of DOE Report No. ET/10023-3. Phase II consisted of a site-specific detailed mine design of conventional and terrace pit scenarios, an environmental assessment, a terrace pit planning and operations manual, and a data collection plan. A total of four mining plans were developed for the selected site, the San Juan Coal Property near Farmington, New Mexico. Engineering data are developed in detail for four mining scenarios referred to as Terrace Pit Mining, Conventional Surface Mining, Surface Mining with Belt Conveyors, and Concept for Mining by Property Owner. Each is described in this report and examined for technological and economic feasibility.

33073 (DOE/ET/10023—4-Vol.2) **Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 2. Terrace pit planning and operations manual.** (Raymond Kaiser Engineers, Inc., Oakland, CA (USA)). Feb 1983. Contract AC01-79ET10023. 22p. NTIS, PC A02/MF A01. Order Number DE83011345.

This is a report on Phase II of a proposed five-phase project to be performed with US Department of Energy support, entitled The Development of Optimal Terrace-Pit Coal-Mining Systems. Phase I of the project dealt with design and economic analysis of terrace-pit mining concepts for surface mining of coal and comparison of these systems with conventional mining sceanrios. These comparisons were made for most of the major coal basins of the United States. Phase I included the publication of DOE Report No. ET/10023-3. Phase II consisted of a site-specific detailed mine design of conventional and terrace-pit scenarios, an environmental assessment, a terrace-pit planning and operations manual, and a data-collection plan. A total of four mining plans were developed for the selected site, the San Juan Coal Property near Farmington, New Mexico. Engineering data are developed in detail for four mining scenarios referred to as Terrace-Pit Mining, Conventional Surface Mining, Surface Mining with Belt Conveyors, and Concept for Mining by Property Owner. Each is described in this report and examined for technological and economic feasibility.

33074 **(DOE/ET/10023—4-Vol.3) Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan.** (Raymond Kaiser Engineers, Inc., Oakland, CA (USA); TRW Energy Engineering Div., McLean, VA (USA)). Feb 1983. Contract AC01-79ET10023. 30p. NTIS, PC A03/MF A01. Order Number DE83011346.

This is a report on Phase II of a proposed five-phase project to be performed with US Department of Energy support, entitled The Development of Optimal Terrace-Pit Coal-Mining Systems. Phase I of the project dealt with design and economic analysis of terrace-pit mining concepts for surface mining of coal and comparison of these systems with conventional mining scenarios. These comparisons were made for most of the major coal basins of the United States. Phase I included the publication of DOE Report No. ET/10023-3. Phase II consisted of a site-specific detailed mine design of conventional and terrace-pit scenarios, an environmental assessment, a terrace-pit planning and operations manual, and a data-collection plan. A total of four mining plans were developed for the selected site, the San Juan Coal Property near Farmington, New Mexico. Engineering data are developed in detail for four mining scenarios referred to as Terrace Pit Mining, Conventional Surface Mining, Surface Mining with Belt Conveyors, and Concept for Mining by Property Owner. Each is described in this report and examined for technological and economic feasibility. This volume is mainly concerned with plans for data acquisition, storage and analysis, especially designating the responsibility for collecting costs of the various operations.

33075 **(DOE/ET/10023—4-Vol.4) Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment.** (Raymond Kaiser Engineers, Inc., Oakland, CA (USA); TRW Energy Engineering Div., McLean, VA (USA)). Feb 1983. Contract AC01-79ET10023. 77p. NTIS, PC A05/MF A01. Order Number DE83011347.

This is a report on Phase II of a proposed five-phase project to be performed with US Department of Energy support, entitled The Development of Optimal Terrace-Pit Coal-Mining Systems. Phase I of the project dealt with design and economic analysis of terrace-pit mining concepts for surface mining of coal and comparison of these systems with conventional mining scenarios. These comparisons were made for most of the major coal basins of the United States. Phase I included the publication of DOE Report No. ET/10023-3. Phase II consisted of a site-specific detailed mine design of conventional and terrace-pit scenarios, an environmental assessment, a terrace-pit planning and operations manual, and a data-collection plan. A total of four mining plans were developed for the selected site, the San Juan Coal Property near Farmington, New Mexico. Engineering data are developed in detail for four mining scenarios referred to as Terrace-Pit Mining, Conventional Surface Mining, Surface Mining with Belt Conveyors, and Concept for Mining by Property Owner. Each is described in this report and examined for technological and economic feasibility. Volume 4 is mainly concerned with environmental impacts and socio-economic factors.

33076 **(NE-SBT—81-20) TORVLINE - a digging system for peat evaluated from the point of national economy.** Jansson, P. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). May 1981. 77p. (In Swedish). (STUDSVIK-EV—81-50). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750505.

Portions are illegible in microfiche products.

The aim of the report has been the economic evaluation of the system of peat production which is based on excavation of peat from a drained bog. The system includes also facilities for dewatering and high-temperature drying. The plant can be constructed of available parts and should produce competitive fuel. Higher degrees of humification render problems of dewatering by pressure. This makes the use of high temperature drying more suitable.

33077 **(PB—83-156794) Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982.** Divers, E.; Jayaraman, N.; Custer, J. (Bureau of Mines, Pittsburgh, PA (USA). Pittsburgh Research Center). Nov 1982. 13p. (BM-IC—8899). NTIS, PC A02/MF A01.

This Bureau of Mines report presents results of an underground evaluation to determine the respirable dust and gas control effectiveness of a combined (push-pull) face ventilation system for coal mines. The system utilizes both blowing and exhaust curtain, continuous miners equipped with radio remote control, and flight conveyors. Bureau of Mines tests showed a 97% reduction in respirable dust concentrations from the usual cab position. This allowed the remote control operator to be well within, and the usual cab position to exceed, Federal respirable dust standards. Tests utilizing a safe tracer gas, sulfur hexafluoride (SF6), to determine the face ventilation effectiveness of the combined blowing and exhaust system showed that the system also has excellent methane dispersion capability.

33078 **(PB—83-157685) Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/1982.** Diamond, W.P. (Bureau of Mines, Pittsburgh, PA (USA). Pittsburgh Research Center). Nov 1982. 29p. (BM-IC—8898). NTIS, PC A03/MF A01.

The Bureau of Mines has been involved in the drilling of vertical, horizontal, and directional coalbed gas drainage boreholes for mine safety since 1964. In that time, boreholes have been drilled in most of the major coal regions of the United States under a wide variety of geologic conditions. Many of the geologic conditions that occur in the coal measures ar e detrimental to gas drainage; others may be beneficial. Analytical techniques to determine the gas content of coal samples and evaluate regional trends of gas distribution have been developed. Drilling techniques that maximize the acquisition of coalbed gas data and geologic information have been determined. Although some of the geologic factors influencing the placement and potential success of coalbed gas drainage boreholes have been reported in papers on individual projects, a complete, systematic compilation has not previously been available. The objective of this paper is to provide information on specific geologic factors that should be considered prior to, during, and after the drilling of coalbed gas drainage boreholes.

0130 Transport And Handling

REFER ALSO TO CITATION(S) 32958, 33015, 33852

33079 **(DOE/FE/60181—3) Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries.** Baria, D.N.; Maas, D.J.; Paulson, L.E. (North Dakota Univ., Grand Forks (USA). Dept. of Chemical Engineering; North Dakota Univ., Grand Forks (USA). Energy Research Center; USDOE Grand Forks Energy Technology Center, ND). 1983. Contract FC01-83FE60181. 16p. (CONF-830542—1). NTIS, PC A02/MF A01. Order Number DE83011488.

From 12. lignite conference; Grand Forks, ND, USA (18 May 1983).

Hot-water slurry drying of low-rank coal produces a slurry which for some coals appears to be stable. With this method of drying, the product does not reabsorb moisture and is partly slurried in its own water. Energy requirements are low because water is removed from the pores of the coal in liquid form by being expelled by carbon dioxide. The carbon dioxide is formed by removing carboxyl groups from the coal structure, which in addition to expelling the water, increases the heating value of the coal and reduces the sodium content, potentially making it a low fouling fuel. Slurries produced by this method potentially can be used in direct combustion as replacement for fuel oil or in Texaco gasifier. 10 figures, 1 table.

33080 **(NE-SBT—81-42) Evaluation of the decantation centrifuge process.** Ekman, E.; Thun, R.; Kytoe, M.; Pikku-Pyhaeltoe, R. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 8 Oct 1981. 43p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750538.

Portions are illegible in microfiche products.

This process has the potential of a peat production method which might become independent of climatic conditions. The advantage of the method is its dewatering stage which can be used in various applications of peat processing.

33081 **(NE/TORV—81-4) Pumping of peat slurry - at long distances.** Rahm, L.; Fransson, L. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jan 1981. 73p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750506.

Portions are illegible in microfiche products.

The economy and existing techniques of raw peat slurry pumping are reviewed. The suspended and fine grained raw peat shows that the most varying flow resistance depending on viscosity, concentration by mass, temperature degree of decomposition and flow speed. The optimum concentration of peat by mass should be between 4 and 6 per cent when being transported as slurry at large quantities and long distances. Heast energy consumption is found to at 1-2 per cent by mass. The cost of pipeline and dewatering, however, will then be high. The method of mining without predraining the boj is presented with transport by large centrifugal pumps at an overall pressure of 2.5 MPa and the pumping stations spaced at 15-30 km apart. Solar energy or low temperature waste heat is used in the final dryin process. This hydraulic method has been compared with milled peat and the belt-line-method. It was found to be the cheapest at annual capacities above 200 000 tonnes with a concentration of 50 per cent by mass at 10 per cent interest rate. The distance of pumping has less impact then expected. After some 90 km of pumping the cost of peat fuel is equivalent to 580 SEK per TOE (ton oil equivalent) at an annual mining quantity of 250 00 tons. Pumping of peat slurry is also favourable at oil embargo, lacking of highways and transport of large quantities.

33082 **(NP—3770052) Determination of expected breakage of raw coal muck by simulated operational stress with special regard to raw-material influence parameters.** Hermanns, K.E. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 26 Sep 1980. 199p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770052.

Portions are illegible in microfiche products; Thesis.

The aim of the thesis is to collect precise data on the breakage behaviour of differently composed raw coals on one hand and the breaking effect of individual stress points on the other hand by investigating parameters or functions. This is a first step towards precalculating the coal breakage which occurs between coal extension and upgrading.

33083 **(NP—3770113) Briquetting behaviour of the raw fine coal sulphite waste lye mixtures and stability of the agglomerates with pressure gasification.** Galbenis, N. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 25 Jan 1980. 178p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770113.

Portions are illegible in microfiche products; Thesis.

The compacting of raw fine coal using sulphite waste lye as binder is investigated here with the aim to produce a suitable particle fuel for the solid bed pressure gasification reactor. In order to maintain the desired briquetting conditions, compression tests were firstly carried out in a laboratory stamp press and the following parameters were varied: Ash content, grain size, sulphite lye addition, water content, duration and quantity of mixing, compressing pressure, and drying time. The briquetting parameters have to be more specifically determined for briquetting on a technical rolling press than for the laboratory stamp press. To test the extent of the change in strength of the compacts under gasification reactor conditions, briquettes and scabbing were carbonized at low temperature at normal pressure as well as raised pressure to 30 bar at 600°C final temperature. The abrasion values of these agglomerates and their reactivity to CO_2 were determined. How the agglomerate strength changed during partial gasification was also tested.

33084 **(SV-FUD—1-7) Coal-liquid mixtures. A technical study.** Vallejo, Y. (National Maritime Inst., Feltham (UK)). Jan 1982. 105p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750454.

Portions are illegible in microfiche products.

A literature review is presented. The COM-project in Uppsala (Fyriskraft) is described. Component testing in Uppsala and Vaesteraas is summarized. Experiments with the following components are given details for: pumps, flowmeters, valves.

33085 **(SVF—125) Coal cleaning by physical methods prior to combustion.** Carlson, R.; Forssberg, E.; Ryk, L. (Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden)). Feb 1982. 194p. (In Swedish). (KHM-TR—20). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750473.

Portions are illegible in microfiche products.

The possibilities to further clean steam coal at the power plants prior to combustion have been analysed. The present paper describes results of an investigation of the possibilities to clean one Polish and one U.S.A. coal. After crushing to below 3 mm the coals have been treated in a slime jig. The middlings were further comminuted and beneficated by means of flotation, shaking table, wet high gradient magnetic separation and oil agglomeration. Sulfur, pyritic sulphur, ash and different trace elements have been assayed. The results of the experiments show that it ought to be possible to remove 50-80 per cent of the original content of pyritic sulphur and 50-70 per cent of the original ash from coal of the type studied here. A third or more of the original mercury content can be removed, as well as significant proportions of the other trace elements, especially selenium and cadmium. The results of these experiments have been utilized in a design study of a cleaning plant associated with a projected 2 x 600 MW power station at Oxeloesund in Sweden. The investment cost of a plant with feed capacity of 525 t/h has been estimated at 235 MSEK. Operating costs are estimated at 8.25 SEK. per ton.

0140 Combustion

REFER ALSO TO CITATION(S) 32941, 32954, 32955, 33015, 33057, 33982

33086 **(DOE/MC/16000—1294-Vol.4) Modeling of fluidized-bed combustion of coal. Volume IV. AFBC transient models. Final report.** Louis, J.F.; Tung, S.E. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). May 1982. Contract AC21-81MC16000. 233p. NTIS, PC A11/MF A01. Order Number DE83001908.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A transient model of coal combustion in atmospheric fluidized bed coal combustors is developed based on the steady state combustion model of Congalidis and Georgakis. The slow dynamic modes of the system are shown to correspond to the carbon population balance and the emulsion energy balance, solbent solids included. All other heat and mass balances that complete the model are assumed in pseudo steady state. A backward Gear integrating package and a nonlinear algebraic equation root finder were used for simultaneous solution of the system of ordinary and differential

equations. Parallel turnup and turndown are shown to be viable alternatives to bed slumping, but the time constants and the magnitude of changes in the bed properties depend greatly upon design characteristics of sorbent overflow and immersed steam tube area. An overflow orifice of variable impedence should be designed since for an overflow orifice of fixed impedence, the time constant for the bed height and weight to reach steady state is on the order of 200 minutes. The immersed steam tube area should be designed to vary with bed height in order to minimize the magnitude of changes in bed properties and thereby enhance the load following characteristics. For parallel turnup and turndown, initial inverse dynamic responses of all bed properties can occur, and for parallel turndown, can result in bed extinction. From the ignition and extinction characteristics of bed startup, a feasibility region of bed startup as a function of excess air ratio and carbon loading is estimated.

33087 **(ECN—83-024) The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983.** Pelser, J. (Stichting Energieonderzoek Centrum Nederland, Petten). Feb 1983. 33p. (CONF-830355—1). ECN, P.O. Box 1, 1755 ZG Petten, Netherlands.

From Meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Poliytique Scientifique; Brussels, Belgium (25 Mar 1983).

The objective of the IEA atmospheric fluidized bed combustion (AFBC) programme is to demonstrate the technical feasibility, reliability and economics of employing the AFBC technique in boilers and thus provide design and operating experience for wide application. There are nine member countries in the programme: Canada, Denmark, Italy, Japan, The Netherlands, New Zealand, Norway, Sweden and Switzerland. They have all undertaken to design, construct and operate AFBC units for power generation, industrial process heat or for district heating, and they have agreed to share the technical knowledge and the operating experience gained from the installations. The installations in the member states are described.

33088 **(NE-TEKNIK—81-6) Baal 2 process.** Almloef, G.; Hagqvist, P. . (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1981. 83p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750515.

Portions are illegible in microfiche products.

The Baal 2 process is a combined combustion and purification process, which produces very clean flue gases for all types of fuels, although it is primarily developed for coal and oil combustion. It can also be used for gas cleaning only. The combustion takes place in a pressured boiler, the combustion gas expands through a turbine, where it is adiabatically cooled. The gas is cooled down to a temperature where several gas pollutants are condensed and can easily be separated. A presentation of the Baal 2 process, further development needs and alternative processes are given in this report.

33089 **(STUDSVIK-EB—82-15) Specifications and design of a laminar-flow isothermal drop tube furnace for studies of pulverized fuel combustion.** Gromulski, J. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Mar 1982. 30p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750474.

Part of the project entitled 'The coal combustion', NE (National Swedish Board of Energy Source Development) contract No 1660 361, is aimed at developing an apparatus which will provide data on coal performance in reactions that are important in the combustion of coal. A vital part of the task is to design, construct and test an atmospheric tube furnace which is capable of operating at temperatures up to 1 500 degrees C. An experimental system is required that will afford rapid heating, isothermal reaction, rapid quenching of the reaction, variation of reaction time, study of combustion or reaction with ambient gases, and measurement of the kinetics of the thermal decomposition of closely size-graded coal particles under conditions similar to those occuring in pulverized fuel firing. Attainment of these objectives is the aim of the sub project described in this report. The system is designed to feed coal particles in the size range 20 μm to 500 μm into a controlled high-temperature Drop Tube Furnace (DFT), in the presence of reactive gas. The coal combustion system is a laboratory unit, the basic component of which is an externally heated ceramic tube. Coal particles are supplied from a fluidizing feeder at a uniform continous rate to a water-cooled feeder probe and fall vertically through the feeder. Coal particles entrained in the gas stream are maintained at 'ambient' temperature until they are delivered into the preheated gas stream. Proper design of the mixing orifice and control of flow ensures complete mixing, with coal heating rates of 10 000 degrees C per sec or more. In addition, proper design provides an inverted velocity profile, which ensures that the particles remain in the center of the furnace tube. A water-cooled probe inserted along the furnace axis from the lower collects and rapidly quenches the stream of particles. The solid and gaseous constituents are then separated and collected for analysis.

33090 **Thermochemistry of fluidized-bed atmospheres.** Ficalora, P.J.; DeVan, J.H. (Oak Ridge National Lab., TN). pp 476-492 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract W-7405-ENG-26.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

It is well known that the addition of limestone to a coal-fired atmospheric fluidized-bed combustor (AFBC) quickly results in the formation of a low porosity, fine grained, adhering deposit of calcium sulfate on all metal surfaces. Although it was generally assumed that calcium sulfate would be an innocuous product of the sulfur capture process, tests in a small AFBC showed that sulifdation-oxidation corrosion did not occur in the absence of the sulfate. In order to determine the role of calcium sulfate in the oxidation-sulfidation process the chemical reactions between the sulfate and iron, nickel, cobalt, or chromium were studied by differerential thermal and thermogravimetric analyses. The results of these studies show the iron, nickel, and cobalt react with calcium sulfate to form their respective oxides and sulfides. Chromium does not form a sulfide, but does form a double oxide with calcium oxide. 5 figures.

33091 **Morphology of corrosion of advanced heat exchanger materials in simulated FBC deposits.** Nagarajan, V.; Wright, I.G.; Smith, R.D. (Battelle Columbus Labs., OH). pp 493-510 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC01-80ET15020.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Nickel-base and iron-base alloys intended for advanced heat exchangers were exposed to CaS/CaO, and CaO/$CaSO_4$ deposits at controlled oxygen partial pressures of 10^{-11} to 10^{-13} atmospheres to simulate conditions which might prevail in some zones in fluidized-bed coal combusters (FBC's). The experiments were carried out in a laboratory tube furnace maintained at a constant temperature of 1172°K (1650°F). The experimental results indicated that sulfidation-related accelerated corrosion occurred beneath both types of deposits. Nickel-base were relatively more susceptible to such sulphidation attack than iron-base alloys. In addition, CaS/CaO was found to be more aggressive than $CaSO_4$/CaO, although the morphology of attack was similar in both deposits. 10 figures.

33092 **Consideration of a possible mechanism for the corrosion of high temperature components in atmospheric coal fired fluidized bed combustors.** Minchener, A.J.; Lloyd, D.M.; Cooke, M.J. (National Coal Board, Gloucestershire, England). pp 511-547 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The influence of the microenvironment on the corrosion performance of candidate materials for high temperature metal components in atmospheric coal fired fluidized bed combustors is discussed. A tentative mechanism is postulated to explain the corrosion of high temperature materials in such an environment. The effects of various operational parameters on the extent of attack are considered in the context of the proposed hypothesis. 7 figures.

33093 **Erosion and erosion-corrosion in fluidized bed combustor systems.** Jansson, S.A. (STAL-LAVAL Turbin AB, Finspong, Sweden). pp 548-560 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Little knowledge exists about the conditions under which erosion or erosion-corrosion of in-bed components will occur. It is suggested that solids flow patterns in the beds are especially important in establishing the erosive factor for a particular system (type of bed solid, placement of bed tubes and other components, air distributor design, fuel and sulfur sorbent injection mode, etc.). Bed solids particles are suggested to interact as packets when in contact with in-bed component surfaces. Other erosive action can result from the formation of gas jets inside the bed, resulting in a grit-blasting of in-bed components. A fretting-type wear can also result if foreign objects are present within the tube bundle. Experience from both atmospheric and pressurized fluidized bed combustion systems suggests that cyclones, piping and other down-stream components will suffer no special erosion or erosion-corrosion problems provided the operating conditions and materials for these components are suitably chosen. 9 figures.

33094 **Erosion/corrosion of turbine blades in coal combustion products.** McCarron, R.L.; Brobst, R.P. (General Electric Co., Schenectady, NY). pp 583-600 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Details of the PFBC materials test run at the Exxon Miniplant and CURL Leatherhead facilities are summarized. These tests each ran for 1000 hours and airfoil specimens of various gas turbine materials were exposed to the PFBC effluent. The specimens were installed in test sections which accelerated the gases to 800 to 900 fps approaching the leading edges of the airfoils, and 1400 fps leaving the last reaction stage. Results of these tests have allowed the specification of general hot gas particulate cleanup requirements for turbine erosion tolerance. More recently testing in a high velocity erosin/corrosion simulator have allowed a more detailed assessment of the variables which affect erosion. 23 figures.

33095 **Development of a technique for measuring oxygen partial pressures within a fluidized bed.** Minchener, A.J. (National Coal Board, Gloucestershire, England); Stringer, J. pp 832-859 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

It has been postulated that corrosion of in-bed metal components in a coal fired fluidized bed combustor is due in part to the existence of low oxygen partial pressures within the bed. A measure of the oxygen partial pressure is therefore important in aiding the determination of the corrosion mechanism. The objective of this ongoing research program is to establish a technique that can provide a measure of such concentrations. An electrochemical probe has been used for this study and results so far obtained, at various operating conditions, are reported.

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 32974, 32983, 32988, 32990, 32991

33096 **(NP—3770106) Coke-Making 1990: World coke demand and coke overn capacity requirements in 1985 and 1990 with a view into the 1990s.** (Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.)). Dec 1980. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770106.

Portions are illegible in microfiche products.

The program of the study is the - characterization of present world coke oven capacity (size, age, technical standard), the determination of future coke demand (production of steel by processes - production of pig iron - demand for coke) and the trends of the future availability of coke (environmental restrictions - coke oven capcity - availability of coking coal).

33097 (SAND—82-2355, pp 3-6) **Fossil energy's role in synthetic fuels.** Wieber, P.R. (Morgantown Energy Tech. Center, WV). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

The current status of Fossil Energy research is as follows. The Administration and the Congress are engaged in the give-and-take of resolving a Federal Fossil Energy research budget ranging between $100 million and $400 million for FY-83. Activity in the private sector appears to be significantly reduced due to the adverse economy. A fossil energy research strategy is evolving that hopefully will provide a rationale for determining the longer-term funding levels and priorities that address the national interest. This strategy recognizes that commercial production lies in the domain of the private sector, while an appropriate federal role is to develop the technology base that reduces risks to a level where industry can decide to commercialize particular technologies via final development and construction. The dominant driving force for this strategy is protection of our nation's future domestic welfare. A potential shortage of liquid fuels is the principal near-term (the rest of this century) problem and its relief should be the highest priority. There are adequate US reserves of natural gas for several decades if conventional and unconventional gas resources can be produced. Finally, in the longer-range, liquids, gas and electricity supply problems will arise and persist after the year 2000. A broad-based government R and D program should address these needs at a relatively steady funding level from year to year. This is an area where the federal role is clear. The long-range national perspective is best held by the government.

33098 (SAND—82-2355, pp 33-41) **Rationale for domestic synthetic fuel alternatives.** Ban, S.; Woodcock, K. (Gas Research Inst., Chicago, IL). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Current analyses of future gas demand/gas supply scenarios for the United States indicate that pipeline quality gas (SNG) derived from available fossil fuels, biomass and wastes will play an increasing important role in meeting the nation's energy requirements as we approach and enter the twenty-first century. This paper provides a brief review of the changing gas supply and demand picture relative to the need for SNG, summarizes the results of current GRI projections of US energy supply and demand, and describes the GRI SNG R and D program now being pursued. Based on considerations of gas supply/demand scenarios, available resources and the state of technology development, the following conclusions can be reached regarding SNG Supply R and D: (1) clear rationales exist for the continuation of an active R and D effort to provide improved technology for SNG processes which can be commercialized and can contribute to US pipeline quality gas needs; (3) while large quantities of domestic and importable natural gas are available, demand, not supply, will be the problem if new technology fails to develop the lowest gas supply options fully; (3) the large coal resources and the potential for large biomass resources in the US provide a basis for continuing to develop processes for

SNG production utilizing these resources in order to ensure the continued availability of pipeline quality gas and the opportunity for least cost energy service options; and (4) the technology bases which now exist are strong indications that processes and systems which are economically competitive and environmentally acceptable can be developed for the improved production of SNG from coal and biomass.

0160 Health And Safety

REFER ALSO TO CITATION(S) 32945

33099 **(NP—3770065) VG annual report 1981.** (Versuchsgrubengesellschaft m.b.H., Dortmund (Germany, F.R.). Versuchsgrube Tremonia). 1981. 111p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770065.

Portions are illegible in microfiche products.

Accident risks and occupational diseases in mining have been studied in the Tremonia test mine. Research activities in the fields of explosions and blasting, pit fires, shaft hoisting, measurement and calculation are reported on. Cooperation with mining authorities and research institutions is mentioned.

33100 **(PB—83-129551) Carcinogen assessment of coke oven emissions (revised draft).** (Environmental Protection Agency, Washington, DC (USA)). Nov 1982. 217p. NTIS, PC A10/MF A01.

Coke oven workers in Allegheny County, Pennsylvania and at 10 non-Allegheny County coke plants in the United States and Canada were found to be at an excess risk of mortality from cancer of all sites and from cancer of the lungs, bronchus, and trachea, kidney, and prostate. An important finding of this study was the dose-response found by both length of exposure and intensity of exposure (top or side of the ovens) for mortality from cancer of the lungs, bronchus, and trachea. A study of Japanese coke oven workers also found them to be at an excess risk of lung cancer mortality. British studies of cancer mortality in coke oven workers have generally been negative, but there were serious weaknesses in these studies.

0170 Legislation And Regulations

REFER ALSO TO CITATION(S) 32972, 33068, 33861

33101 (SAND—82-2355, pp 133-146) **Permitting requirements and procedures in selected states with UCG potential.** Owen, T.E.; McTernan, E.M.; Bartke, T.C. (Laramie Energy Tech. Center, WY). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

Recent studies have determined that suitable coal resources for underground coal gasification (UCG) exist in a number of geographical regions of the United States. States with high potential for UCG include Illinois, Texas, Washington and Wyoming. Each state has established its own administration and procedures to obtain operating permits for an industrial facility such as an UCG site. This paper presents the permitting procedures, and information and mitigation requirements for issuance of air quality, water quality; mining and natural resources permits for an UCG facility. Unique characteristics of the permitting process in some states are presented.

02 PETROLEUM

REFER ALSO TO CITATION(S) 32955

0201 Reserves

REFER ALSO TO CITATION(S) 33097

0202 Geology And Exploration

33102 **(DOE/ET/10136—T2) Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs).** Harris, A.G.; Harris, L.D.; Epstein, J.B. (Geological Survey, Washington, DC (USA)). 1978. Contract AI01-76ET10136. 57p. NTIS, PC A04/MF A01. Order Number DE83011707.

Portions are illegible in microfiche products.

Maps are presented which show indices of organic diagenesis, and form part of a data base which includes previously published stratigraphic and structural data for assessing hydrocarbon potential in the Appalachian and structural data for assessing hydrocarbon potential in the Appalachian basin (de Witt, 1975; de Witt and others, 1975; Harris, 1975; Miller, 1975). The potential for oil and gas production in any basin depends on the presence of source beds, favorable hydrocarbon channelways, and structural and stratigraphic traps. Crucial to these factors is the level of organic diagenesis or thermal maturity within the basin. Numererous studies have shown that depth and duration of burial and geothermal gradient (time and temperature) are the chief elements producing organic diagenesis.

33103 **Chemical exploration by computer.** Bather, J.M. (University of Manchester Institute of Science and Technology). *Petroleum Review;* **36**: No. 427, 8-12(Aug 1982).

Examines a computerized method of analyzing core samples used at UMIST (with a grant from the US DOE) to study the chemical processes that accompany diagenesis and catagenesis. Based upon a recognition of hydrocarbon chromatographic patterns associated with pyrolytic volatile matter released from geological samples, use of a computer to analyze the mass spectra data provides an additional opportunity to employ the power of the computer using the selective ion monitoring mode. Presents the odd/even ratio as defined by the Carbon Preference Index (CPI).

0203 Drilling And Production

REFER ALSO TO CITATION(S) 32954, 33138, 33189, 33190

33104 **(CONF-8205140—) International conference on microbial enhancement of oil recovery.** Donaldson, E.C.; Clark, J.B. (eds.). (Oklahoma Univ., Norman (USA). Engineering Foundation; USDOE Bartlesville Energy Technology Center, OK). Feb 1983. 225p. NTIS, PC A10/MF A01. Order Number DE83009741.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An International Conference on Microbial Enhancement of Oil Recovery (MEOR) was held May 16-21, 1982 at Afton, Oklahoma. Its objective was to bring together microbiologists and engineers from around the world who are trying to develop methods for the application of microbial systems to the petroleum industry (32 scientists from 12 foreign countries attended). The conference generated 32 papers, nine poster presentations, and a short course on the fundamentals of petroleum reservoir geology. It showed that a new, more fundamental, approach is being taken in the search for ways to apply microbes to oil recovery. Great effort is being expended by microbiologists to understand the complex subsurface environment of a petroleum reservoir in relation to microbial metabolism; and by engineers to understand the fundamental activities of microbes before attempting to bring the two systems together. The conference was organized into seven formal sessions and three informal poster sessions that followed consecutively during the five days of the conference. A review of the papers revealed that they fall naturally into the following four divisions which are used in the organization of the proceedings: (1) microbes and their metabolites;

(2) transport of bacteria in porous geological materials; (3) application to heavy oils; (4) MEOR field applications. All papers have been abstracted and indexed for the Energy Data Base.

33105 (CONF-8205140—, pp 12-14) **Growth and biosurfactant production of a bacteria in continuous culture.** Guerra-Santos, L.; Kaeppeli, O.; Fiechter, A. (Swiss Federal Inst. of Tech., Zurich). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The bacterial strain Rsan ver [Pseudomonas sp.] was reported to produce surface active compounds equally well with glucose or hydrocarbon as a substrate. The behavior of the culture and surfactant production were studied in a bioreactor, in batch culture, and in continuous culture. The surface tension of surfactant from batch culture growth was considerably less than that obtained in continuous culture. 1 table.

33106 (CONF-8205140—, pp 20-28) **Adherence of bacteria to hydrocarbons.** Rosenberg, E.; Rosenberg, M.; Gutnick, D.L. (Tel Aviv Univ., Ramat Aviv, Israel). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Two general types of interaction between microorganisms and hydrocarbons have been postulated: (A) adherence of cells directly to large oil droplets; and (B) release of extracellular surfactants or emulsifiers that greatly increase the hydrocarbon:aqueous interfactial area. In the case of the hydrocarbon-degrading Acinetobacter calcoaceticus RAG-1 both types of interaction are operative; cells adhere avidly to test hydrocarbons (xylene, octane, hexadecane and crude oil) and also produce a potent polyanionic emulsifier referred to as emulsan. Mutants of A. calcoaceticus RAG-1 deficient in emulsan synthesis are still able to adhere to hydrocarbons and grow on hexadecane or crude oil as the sole source of carbon and energy. However, mutants of A. calcoaceticus RAG-1 unable to adhere to hydrocarbons also failed to grow on hydrocarbon substrates. It was demonstrated that adherence is a prerequisite for growth on hexadecane under two conditions: low initial cell density and limited emulsification of the substrate. Such conditions prevail in most natural environments. On the other hand, bioemulsification is a cell density dependent phenomenon. Relatively high cell densities are required to produce enough extra-cellular emulsifying agent to markedly affect the hydrocarbon substrate. 7 figures, 3 tables.

33107 (CONF-8205140—, pp 29-37) **Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry.** Wang, X. (Inst. of Microbiology, Beiring, China). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

A strain of bacterium 74-230 producing extracellular polysaccharide from crude oil or heavy liquid paraffin as C-source was isolated and named Brevibacterium viscogenes n. sp. 74-230. The yields of polysaccharide were 8g/1 from 12 percent (W/V) crude oil and 12 g/1 from 4 percent (V/V) heavy liquid paraffin. The conversion rate of added paraffin was over 40 percent. Its rheological properties, shear thinning effect, shearing resistance, sensitivity to salts etc. were determined and compared with xanthan, partially hydrolyzed polyacrylamide, and carboxylmethylcellulose. The properties of this polysaccharide are well comparable to those of xanthan, and far better than the two others. It is noteworthy that this polysaccharide is produced from crude oil or its fraction, while xanthan is produced from carbohydrate. The diluted fermentation fluid was used as driving fluid in laboratory scale model experiments. When the injection volume corresponded to 20 percent of the pore volume, the oil recovery was enhanced to about 9 percent of the original reserves. Laboratory evaluation of the fermented gummy fluid from heavy liquid paraffin indicated that the polysaccharide is a suitable drilling fluid additive. Preliminary drilling experiments showed a promising result. 20 figures, 5 tables.

33108 (CONF-8205140—, pp 38-42) **Physiological types of microorganisms useful for enhanced oil recovery.** McInerney, M.J. (Univ. of Oklahoma, Norman). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The success of an in situ microbial enhanced oil recovery (MEOR) process depends on the selection of useful organisms that can function in the environment of the reservoir. Thermophilic, anaerobic microorganisms that grow in high salt concentrations (2 to 10 percent) at neutral pH would be suitable for most reservoirs. Knowledge of how nutrient limitation affects microbial growth and metabolism of the organism will be important for process control. Nitrogen limitation may be effective in controlling biopolymer production. The kind of nutrient limitation as well as the thermodynamic efficiency of the metabolic pathway are important considerations in regulating the proportions of fermentation products produced by anaerobic bacteria. The pH of the reservoir will be important for optimal butanol production. Further work on the effects of nutrient limitation as a means to control in situ MEOR processes is needed using populations attached to surfaces as the experimental system. 2 figures, 2 tables.

33109 (CONF-8205140—, pp 43-47) **Isolation and screening of Clostridia for possible use in microbially enhanced oil recovery.** Grula, E.A.; Russell, H.H.; Bryant, D.; Kenaga, M.; Hart, M. (Oklahoma State Univ., Stillwater). Feb 1983. NTIS, PC A10/MF A01. Contract AS19-80BC10302.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Because of the anaerobic environment in reservoirs, a potentially useful group of microorganisms for microbial enhanced oil recovery (MEOR) would be the Clostridia. The authors reported on a screening program designed to isolate species of Clostridium that would have useful characteristics for in situ processes. They looked for the following characteistics: (1) production of large amounts of gas (primarily CO_2); (2) production of large amounts of low molecular weight organic acids; (3) production of large amounts of low molecular weight organic solvents (primarily alcohols and acetone); and (4) production of large amounts of low molecular weight nonionic emulsifiers that would form oil-in-water emulsions. Techniques were devised for rapid screening, and several potentially very useful Clostridium strains were isolated. The authors emphasized the difficulty of isolating species of Clostridium that performed well metabolically in high (5.0 to 17.5 percent) concentrations of sodium chloride. 7 figures, 3 tables.

33110 (CONF-8205140—, pp 60-70) **Investigation of the transport of bacteria through porous media.** Jang, L.K.; Sharma, M.M.; Findley, J.E.; Chang, P.W.; Yen, T.F. (Univ. of Southern California, Los Angeles). Feb 1983. NTIS, PC A10/MF A01. Contract AS19-81BC10508.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

This paper summarizes the work done to study the transport of bacteria through oil bearing geologic formations. It represents the first such systematic attempt to describe qualitatively and quantitatively the effect of various parameters on the retention of bacteria by a reservoir rock. The bacterial species studied here are Pseudomonas putida, Clostridium sp. and Bacillus subtilis, each chosen to represent a certain class of bacteria that enhance oil recovery in their own way. The transport of these species through sandstone cores and sandpacks was studied. In low permeability rocks and at high inflow concentrations, certain species of bacteria tended to agglomerate and plug the face of the core. However, for nonaggregating species, flowing through high permeability rock at relatively low concentations the dominant mechanism of retention was found to be adsorption rather than pore plugging. Clostridium sp. being a nonaggregating species is the most easily transported. Addition of small amounts of nonionic surfactant tends to prevent aggregation and is found to enhance the transport of the cells. The presence of residual oil in the core was found to facilitate transport too. The electrostatic and Van der Waals interactions between the bacteria and rock were studied. The surface charge properties of the detrital grains and the clays in the sandstone and the bacteria were studied in detail. Preliminary model calculations done on estimating interaction energies between bacteria and rock show that such a model does indeed predict most of the observed behavior. Hamaker constant corresponds well with the experimentally observed one.

33111 (CONF-8205140—, pp 71-75) **Transport phenomena and plugging in Berea sandstone using microorganisms.** Jenneman, G.E.; Knapp, R.M.; Menzie, D.E.; McInerney, M.J.; Revus, D.E.; Clark, J.B.; Munnecke, D.M. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The success of an in situ microbial plugging process depends on the ability: (1) to selectively transport the microorganisms into the water-sweep portion of the reservoir; (2) to transport the nutrients required for growth by these organisms; and (3) to reduce the apparent permeability of the reservoir rock stratum as a result of microbial growth and metabolism. This would divert the displacing fluid from plugged high permeability zones to the unswept low permeability zones that have higher residual oil saturations. These three aspects will be addressed in this paper to demonstrate feasibility of the process. Conclusions are: (1) nutrients essential for microbial growth can be transported in concentrations sufficient to support good biomass production; (2) nutrients and cells are selectively transported to high permeability zones; (3) indigenous microorganisms exist under all conditions tested and are capable of contributing to the plugging activity. 7 figures.

33112 (CONF-8205140—, pp 76-79) **Possible reservoir damage from microbial enhanced oil recovery.** Crawford, P.B. (Texas A & M Univ., College Station, TX). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Texas has more than 2500 secondary recovery or water injection projects. The water processing facilities, surface injection equipment, wells and producing facilities are all in place to be used if a profitable microbial enhanced oil recovery method can be developed. It will be necessary that the potential reservoir damage from microbial EOR be resolved. Great expense is presently entailed to keep the injection water free of all substances which may invite trouble. The water may be aerated or deaerated. Various chemical compounds in the water may be precipitated or solubilized. The water is filtered, polished, corrosion proofed, and the pH adjusted to ensure a suitable injection water. In some cases the well may be acidized to increase water injectivity. Periodically large doses of chlorine may be used to reduce or eliminate live organisms of most all types which may have found their way into the system. The connecting pores at the face of the well and back into the pay may be only a fraction to a few microns in diameter, and the pores are easily plugged. If the microorganisms should plug the pores at the sand face or in the interior, the water injectivity may be reduced by a factor of two or more. Such will postpone the oil production until the project may become unprofitable and the enhanced oil recovery project would be suspended. Some oil sands contain bentonite which will swell when one injects fresh water. In many cases the reservoir engineers are required to inject salty, noxious water to keep the water injectivity high. In summary it will be necessary that any proposed microbial EOR method be sufficiently tested to ensure compatibility with presently practiced injection techniques if microbial EOR is to receive wide application in the oil field. 3 figures, 4 tables.

33113 (CONF-8205140—, pp 80-85) **Plugging and penetration of petroleum reservoir rock by microorganisms.** Updegraff, D.M. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The author reported that rocks of high permeability show a greater fractional decrease in permeability upon injection of bacteria than those of lower permeability. Therefore, this suggests the possible use of bacteria for selective plugging or stratification rectification to increase sweep efficiency, and hence oil recovery, in water-flooding. He also found that small bacteria penetrate through most reservoir rocks, but not without a serious degree of plugging except in rocks with an appreciable fraction of their pores with a minimum pore entry diameter of 3 microns or more. Such rocks usually have a permeability greater than 100 md. He concluded that bacteria may exert a much greater plugging effect when they multiply within the reservoir rock than when cells are injected; therefore, bacterial plugging represents an important limiting factor for microbial enhanced oil recovery. 2 figures.

33114 (CONF-8205140—, pp 88-93) **Potential for use of microbes in the production of heavy oil.** Jack, T.R.; Thompson, B.G.; DiBlasio, E. (Univ. of Calgary, Alberta). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Bacterial cultures capable of growing anaerobically on 3 percent sugar beet molasses in full strength oil brine (6.5 percent salinity) at the temperature found in the Golden Lake oil reservoir, Lloydminster were sought out by classical selection and adaptation procedures. From perliminary results it appears that anaerobic bacteria capable of growing under the conditions of the heavy oil reservoirs in the Lloydminster region can produce extracellular slimes (polysaccharides) in a controllable fashion and that these bacteria can be injected into such a reservoir successfully in a non-slime inducing medium. Further, slime formation can be induced in situ by the subsequent introduction of an appropriate slime inducing medium. These bacteria could provide a feasible system for plugging the high permeability channels which normally thwart heavy oil production by waterflooding in the Lloydminster fields.

33115 (CONF-8205140—, pp 94-101) **Microbial processes in the recovery of heavy petroleum.** Singer, M.E.; Finnerty, W.R.; Bolden, P.; King, A.D. (Univ. of Georgia, Athens). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

This research project has established: (1) the isolation of microorganisms that utilize heavy crude oils as sole sources of carbon and energy; (2) the isolation of bacterial isolates that produce extracellular surface active compounds; (3) the identification of bacterial isolate (H-13) that is capable of reducing the viscosity of heavy crudes in excess of 95 percent; (4) one mechanism of viscosity reduction by H-13 is the formation of stable oil-in-water emulsions; (5) the biosurfactant produced by H-13 is a glycolipid; (6) the critical micelle concentration (CMC) of crude glycolipid is 1.5 mg/ml with a measured minimum interfacial tension of 2.1×10^{-2} dynes/cm; (7) the CMC of purified glycolipid is 1.0 mg/ml with a minimum interfacial tension of 1.41 dynes/cm; (8) the minor glycolipid fraction exhibited an interfacial tension of 4.4×10^{-1} dynes/cm. The application of specifically tailored microbial processes through physiological and genetic means can be accomplished to produce useful changes in oil. The application of genetic and bioengineering concepts to EOR and oil production are dependent upon the acquisition and development of basic and definitive data-bases. The future interface between petroleum engineerig and the application of microbial processes appears complementary in terms of contributions that the microbiologist can offer to oil recovery and production.

33116 (CONF-8205140—, pp 102-111) **Microbial activities and changes in the chemical physical properties of oil.** Westlake, D.W.S. (Univ. of Alberta, Edmonton). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Microorganisms, in particular aerobic bacteria, readily bring about changes in the chemical and physical properties of oil under non-restrictive growth conditions. Such changes have been readily demonstrated under laboratory conditions, in surface terrestrial and marine oil spills and, based on comparative chemical-physical observations, implied to have taken place in some oil reservoirs. The author reviewed several articles that demonstrate the changes under laboratory and field conditions. Aerobic bacterial attack of crude oils generally results in loss of n-alkanes, isopenoids, and low-molecular-weight aromatic and sulfur heterocyclic compounds. The author reported that the loss of these compounds is associated with changes such as lowering of pour point and increase of density.

33117 (CONF-8205140—, pp 112-114) **Biosurfactants and enhanced oil recovery.** Cooper, D.G. (McGill Univ., Montreal, Quebec). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The author discussed a different type of surface active compound which is produced by Corynebacterium lepus. This strain

produces two types of biosurfactants which are effective for the release of bitumen from tar sands. When the biosurfactants are isolated at the end of the fermentation, one obtains a mixture of lipids. However, if the active agent is isolated during exponential growth, the product is a mixture of corynomycolic acids (α-alkyl-β-hydroxycarboxylic acids). The compounds were also found to be very effective reagents for crude oil-water emulsion coalescence and could prove to be commercially significant for de-emulsification of produced fluids, especially in stream recovery operations.

33118 (CONF-8205140—, pp 118-123) **Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery.** Bubela, B. (Baas Becking Geobiological Lab., Canberra City, Australia). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The author examined the effects of simulated reservoir environmental conditions on microbial cultures. He found that the toxicity to heavy metals increases at elevated temperature; and, since heavy metals are frequently present in reservoir waters, the increase of temperature in the subsurface (25° + 18°C/km of depth) might prevent the effective application of an otherwise suitable microbial culture. Therefore, microbes intended for use in a petroleum reservoir should be tested with the reservoir fluids at simulated subsurface environmental conditions. The author also observed changes in the morphology of Bacillus stearothermophilus when exposed to pressures up to 20,000 kPa in combination with a temperature increase up to 60°C. The bacteria changed from rod-shaped to a spherical form. This change makes the organism more suitable for EOR since the coccoidal forms pass through pore throats more readily. 2 figures.

33119 (CONF-8205140—, pp 124-128) **Barobiology of deep oil formations.** Marquis, R.E. (Univ. of Rochester, NY). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The author remarked that a considerable amount of pilot testing of bacteria selected for EOR is necessary to establish barotolerance and the effects of pressure on the limits of tolerance of bacteria for temperature, salinity, and on growth rate and formation of endospores. He based this on the lack of research on specific species to determine the influence of these environmental conditions that will certainly be imposed on bacteria used for EOR. In agreement with many others, the author noted that some sulfate reducers have been found to be more detrimental to oil field operations than helpful; however, a concentrated study to develop more information on the numbers and types of microorganisms indigenous to oil reservoirs may result in the discovery of bacteria that are capable of releasing oil when activated by proper nutrients. He noted that low pressure generally enhances the growth rate of bacterial cultures at their optimal growth temperature, but higher pressures reduce the growth rate at all temperatures. However, growth is a very complicated function that is commonly more barosensitive than simpler metabolic functions: for example, sulfate reducers carried out the reduction of sulfate to sulfide at pressures up to 1.5 mPa even though their growth was completely inhibited at one half that pressure. He concluded that growth is retarded or even stopped by extremely high pressure, but simpler metabolic activities continue, although at a slower rate. 3 figures, 1 table.

33120 (CONF-8205140—, pp 129-134) **Microbial interactions with polyacrylamide polymers.** Grula, M.M.; Sewell, G.W. (Oklahoma State Univ., Stillwater). Feb 1983. NTIS, PC A10/MF A01. Contract AS19-80BC10304.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Polyacrylamides, as they are manufactured for use in oil recovery projects involving polymer floods, are capable of stimulating the multiplication of populations of aerobic soil microorganisms. Aerobic plate counts of soil enrichment cultures in the presence of polymer, using 15 soil samples, were 10 to 100 fold greater than in the absence of polymer. One possible reason for this is the release of ammonia from polymer. Several polymers, with molecular weights ranging from 3 to 4 x 10^6 daltons to 9 to 10 x 10^6 daltons, were shown to be capable fo supporting growth of several strains of soil pseudomonads as a sole nitrogen source in a chemically defined medium. Extent of growth was a function of concentration over the range 0.05 to 0.5 percent. Shear degradation of polymer did not affect its ability to support growth, nor did stated degree of hydrolysis (ranging from 1 to 4 percent to 25 to 35 percent). Growth and sulfate reduction by strains of Desulfovibrio are stimulated under certain conditions by the presence of polyacrylamide in the growth medium. There seems to be a relationship between posible sulfate deficiency in the medium and extent of stimulation by the polymer. We have no evidence that any of the microbial cultures we have used are able to metabolically degrade the carbon chain of the polyacrylamide.

33121 (CONF-8205140—, pp 135-139) **Survey of research on the application of microbial techniques to the petroleum production in China.** Zhang, Z.; Qin, T. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

Petroleum microbial techniques have been investigated in a number of oil fields, research institutes, and universities in China. Most of the work has been done in laborabories. A few pilot tests have been conducted but no definite conclusions have resulted from the tests. Screening of microorganisms and the properties of their products are described in this paper. The results of in-house modeling are also presented.

33122 (CONF-8205140—, pp 140-148) **Microbial enhancement of oil recovery in Romania.** Lazar, I. (Inst. of Biological Sciences, Bucharest, Romania). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The paper is a review of the investigations carried out in Romania, during the last 10 years, on the use of bacteria for the stimulation of oil release from reservoirs. The research was based on the idea of using bacterial populations adapted to the reservoir's conditions. The main sources of bacteria for obtaining such adapted populations were the formation water of the reservoir submitted to microbiological treatment and the fermented scum from sugar processing plants. Under laboratory conditions, the adapted bacterial populations obtained, cause 19.5 to 48.8 percent of oil release in a collector. Under the field conditions, the same adapted bacterial populations produce an increase of oil flow, from some wells, up to 200 percent for 1 to 5 years. Such an increase of oil production was recorded only in 2 out of the 7 reservoirs injected with adapted bacterial populations and nutrient support on molasses basis. 6 tables.

33123 (CONF-8205140—, pp 149-153) **Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas.** Yarbrough, H.F. (Mobil Research and Development Corp., Dallas, TX); Coty, V.F. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

A field test to evaluate the gaseous bacterial fermentation of sugar as a means of enhancing oil recovery is described. The test was conducted on the Lisbon Unit, Union County, Arkansas, using a two-spot pattern with 400 feet between wells. Laboratory experiments, which preceded the field test, showed that bacterial gases produced within the reservoir rock prior to waterflooding led to better oil recoveries than could be obtained by either waterflooding or gas flooding alone. A two percent solution of beet molasses in fresh water was injected into the Nacatoch formation for a period of six months. Eighteen 220 gallon inoculations of Clostridium acetobutylicum were injected at scheduled intervals. Fresh water began to appear at the production wells seventy days after initial injection began. Fermentation products appeared 80 to 90 days after the first inoculation. Fermentation reactions are discussed which explain the products recovered. An increase in oil production rate occurred soon after breakthrough of fermentation products. Increased production, its significance and the possible mechanisms responsible are discussed. 7 figures.

33124 (CONF-8205140—, pp 154-157) **Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil.** Moses, V. (Queen Mary Coll., London, England); Robinson, J.P.; Springham, D.G.; Brown, M.J.; Foster, M.; Hume, J.; May, C.W.; McRoberts, T.S.; Weston, A. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

In considering the application of microbial enhancement of oil recovery (MEOR) to North Sea reservoirs, the investigators conducted experiments to determine the feasibility of using the crude oil itself as the substrate for anaerobic bacterial growth. The North Sea wells are widely spaced (1 km or more) from isolated platforms where the wells fan out radially from the platform. Thus, the injection of nutrients to support a microbial flora that could penetrate from injectors to the widely spaced producers is not possible since the bacteria would consume the substrate long before it woudl migrate far enough to be effective. Therefore, they have conducted numerous experiments under anaerobic conditions with crude oil as the sole carbon source. Microbial cultures were obtained from a variety of industrial and natural locations and they were maintained for many months at 28°C under an inert gas with a mineral medium and crude oil. Gas and protein production was monitored. Carbon dioxide and protein concentrations rose slowly in all cases; thus these experimets show that anaerobic microbial growth on crude oil is possible and it may be possible to develop a technology for MEOR in the North Sea. Investigation will concentrate on finding cultures that produce metabolic products at higher rates and elucidation of the mechanisms and microbial taxonomy. 5 figures, 1 table.

33125 (CONF-8205140—, pp 158-161) **Some constraints on the use of bacteria in enhanced oil recovery.** Springham, D.G. (Queen Mary Coll., London, England); McKay, A.; Moses, V.; Robinson, J.P.; Brown, M.J.; Foster, M.; Hume, J.; May, C.W.; McRoberts, T.S.; Weston, A. (Queen Mary Coll., London, England). Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The effects of temperatures and pressures in the range of interest on some thermophilic strains are being investigated. This work is at an early stage but good growth has already been observed at 70°C and 30MPa pressure and the investigators seeking to extend the range. They are now optimistic about the chances of getting bacterial growth at pressures and temperaures representative of a significant proportion of the North Sea fields. The exploitation of deep fields still presents many special problems. Assuming that bacteria able to grow in these extreme environments can be found it is unlikely that they will possess the other necessary attributes for MEOR such as, for instance, anaerobic growth on hydrocarbons, the ability to mobilize oil and to spread throughout the rock formation without causing plugging. Strains with a complete range of appropriate properties will thus have to be constructed using the techniques of genetic manipulation to transfer attributes between strains; most probably this will require genetic information to be transferred from other strains into a strain which is temperature, presure and salt tolerant. There are two other serious problems which have to be faced in MEOR operations. One is the growth of unwanted bacteria. Nutrient penetration may also be a problem since nutrients added from the surface will tend to be removed by bacteria in the immediate vicinity of the injection well, thus restricting bacterial growth to a small region of the reservoir. 1 figure.

33126 (CONF-8205140—, pp 162-218) **Petroleum microbiology and the history of its role in enhanced oil recovery.** Hitzman, D.O. Feb 1983. NTIS, PC A10/MF A01.

From International conference on microbial enhancement of oil recovery; Afton, OK, USA (16 May 1982).

The purpose of this paper is to provide a record of past field tests of the microbial enhancement of oil recovery (MEOR) process. Each field test is recorded in the addendum to this paper and the reports are divided by country and within each country by the year of the test. More than 200 field tests have been conducted since 1954, but only about 50 are documented in sufficient detail for good comparison of the results. In most cases, the wells that were inoculated with bacteria for MEOR were of very poor quality because of the conservative attitude of most oil companies toward the injection of bacteria which have a known potential for plugging wells and for causing entire oil fields to go sour, due to microbial production of hydrogen sulfide in situ. As experience was gained in field applications of microorganisms, the techniques became more complex and technically advanced. In some cases the MEOR ws reduced to a well clean-out procedure and in others the objective was the long term stimulation of a large portion of the reservoir. The author developed 12 general conclusions from his review, and perhaps the most important are that: (1) in several reservoirs in a positive response to MEOR was obtained; (2) in situ microbial growth results in chemical and petrophysical changes in the reservoir; and (3) temperature and pressure conditions are not as restrictive to MEOR as laboratory experiments indicate. 17 tables.

33127 **(DOE/BETC—83/1) Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982.** Linville, B. (ed.). (USDOE Bartlesville Energy Technology Center, OK). Apr 1983. 105p. NTIS, PC A06/MF A01. Order Number DE83011813.

Progress reports are presented of contracts for field projects and supporting research on chemical flooding, carbon dioxide injection, thermal/heavy oil, resource assessment technology, extraction technology, environmental and safety, microbial enhanced oil recovery, oil recovery by gravity mining, improved drilling technology, and general supporting research.

33128 **(DOE/BETC/IC—83/1) Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia.** (Department of Energy, Bartlesville, OK (USA). Bartlesville Energy Research Center). Apr 1983. 230p. NTIS, PC A11/MF A01. Order Number DE83011924.

Data are presented for approximately 240 abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee, and West Virginia. Production data were not available on a majority of abandoned fields in New York, Missouri, and Kentucky. Consequently, some fields with less than 10,000 barrels cumulative production are included. The following information is presented for each field: county; DOE field code; field name; AAPG geologic province code; discovery date of field; year of last production; discovery well operator; proven acreage; formation thickness; depth of field; gravity of oil production; calendar year; yearly field oil production; yearly field gas production; cumulative oil production; cumulative gas production; number abandoned fields in county; cumulative production of oil from fields; cumulative production of gas from fields. (ATT)

33129 **(DOE/BETC/QPR—82/4) Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982.** Linville, B. (ed.). (USDOE Bartlesville Energy Technology Center, OK). 1982. 71p. NTIS, PC A04/MF A01. Order Number DE83012565.

Progress accomplished for the quarter ending December 1982 is reported for the following research areas: liquid fossil fuel cycle; extraction (technology assessment, gas research, oil research); liquid processing (characterization, thermodynamics, processing technology); utilization; and project integration and technology transfer. (ATT)

33130 **(DOE/BETC/SP—83/14) Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1.** Ward, D.C.; Garcia, J. (USDOE Bartlesville Energy Technology Center, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Apr 1983. 54p. NTIS, PC A04/MF A01. Order Number DE83012187.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Agreement between the United States and Venezuela was designed to further energy research and development in six areas. This report focuses on Annex III - Evaluate Past and On-

going Enhanced Oil Recovery Projects in the United States and Venezuela. Annex III has separated this portion of the coopertive energy research and development effort into four tasks for study. Energy research and development in the area of Enhanced Oil Recovery has as its goal the more efficient and complete production of the third crop of oil. Methods and techniques must be developed to assist the decision maker in the best timing and method for his EOR project. If a method can be developed to predict production based on certain known reservoir parameters, the producer will be able to make more accurate decisions. Accurate predictive models can be developed if a larger data base with enough data on varied reservoirs and processes is compiled. Statistical algorithms can be developed, tested, and verified with actual production data. New data can be used to recalibrate the models for improved accuracy. The developed models can then be used to evaluate current or anticipated EOR projects.

33131 **(DOE/BETC/SP—83/15) Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1.** Peterson, G.; Schwartz, E. (Department of Energy, Bartlesville, OK (USA). Bartlesville Energy Research Center; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Apr 1983. 469p. NTIS, PC A20/MF A01. Order Number DE83011918.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Agreement between the United States and Venezuela was designed to further energy research and development in six areas. This report focuses on Annex IV - Enhanced-Oil-Recovery Thermal Processes which was divided into seven tasks. This report will discuss the information developed within Task I related to the Department of Energy providing data on the performance of insulated oil-well tubulars. Surface generated steam has been traditionally used in thermal enhanced oil recovery processes. In past years the tubing through which the steam is injected into the reservoir has been bare with relatively high heat losses. In recent years however various materials and designs for insulating the tubing to reduce heat losses have been developed. Evaluation of several of these designs in an instrumented test tower and in an oil field test environment was undertaken. These tests and the resulting data are presented.

33132 **(DOE/BETC/SP—83/16) Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1.** Williams, C.R.; Lichaa, P.; Van Domselaar, H. (USDOE Bartlesville Energy Technology Center, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Apr 1983. 133p. NTIS, PC A07/MF A01. Order Number DE83011933.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Agreement between the United States and Venezuela was designed to further energy research and development in six areas. This report focuses on Annex V - Drilling, Coring, and Telemetry as supporting technology for enhanced oil recovery projects in the United States and Venezuela. Annex V consists of 18 tasks to perform these three projects. This report completes the work for Annex V. Energy research and development in the area of Enhanced Oil Recovery has as its goal the more efficient and complete production of the third crop of oil. Methods and techniques must be developed to assist in the implementation of EOR projects. Technology development that reduces costs and provides better reservoir information often has a direct impact on the economic viability of EOR projects and Annex V addresses these areas. Each of the three areas covered by Annex V are separate entities and are presented in this report as different sections. Each has its own Abstract. The drilling and coring tests were highly successful but only a limited amount of work was necessary in the Telemetry area because a field test was not feasible.

33133 **(DOE/BETC/SP—83/17) Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1.** Wesson, T.C.; VonDomselaar, H. (USDOE Bartlesville Energy Technology Center, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Apr 1983. 37p. NTIS, PC A02/MF A01. Order Number DE83012188.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report, dealing with the US/Venezuela Cooperative exchange agreement on residual oil saturation (Annex VI), contains the results of efforts by scientists from both countries to improve the state of present technology for accurately measuring the amount of residual oil remaining in a particular reservoir of interest. To date, those efforts have resulted in an exchange of ideas through a sharing of technical literature and bibliographic listings pertinent to the subject, reciprocal visits to the laboratories and field sites where residual oil saturation measurement R and D is in progress, an exchange of ideas through workshops held in each country, and open discussions covering areas of future cooperative R and D. The text of the basic agreement , Annex VI and all amendments, are appended to the report. In addition to a chronicle of events detailing progress under Annex VI, this report also inlcudes a discussion of future work to be performed in the areas of subsidence accompanying the extraction of oil and interwell oil saturation measurement. A meeting was held in Bartlesville May 10 and 11 to formulate plans in this area.

33134 **(NP—3770050) Stress of the drilling shaft in deep-well drilling.** Gutsche, W. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 14 Feb 1980. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770050.

Portions are illegible in microfiche products; Thesis.

Based on evaluation of literature the authors describe and analyse the stress of the drilling shaft caused by operation. The interaction of drilling tools and rocks causes periodical strain on the steel drill, which are channelled as axial vibrations in the drilling shaft and cause high dynamic stress. By using shock absorbers one tries to decouple the vibrations coming from the drilling device from the rest of the drilling shaft. The measuring instrument DHR-FT for use in a well is being developed and constructed.

33135 **Black-oil reservoir simulator is now available.** Fanchi, J.R.; Carroll, H.B. (Keplinger & Associates Inc., Tulsa, OK). *Oil and Gas Journal;* **80**: No. 37, 66-68(13 Sep 1982).

Describes the US DOE Black Oil Applied Simulation Tool (BOAST), a program which can simulate oil and/or gas recovery by fluid expansion, displacement, gravity drainage, and capillary imbibition mechanisms. BOAST, which simulates isothermal, darcy flow in three dimensions, assumes that reservoir fluids can be described by 3 fluid phases (oil, gas, and water) of constant composition with physical properties that depend on pressure only. Given well model allows specification of rate or pressure representations of well performance; and user can shut in, add, or recomplete wells during the simulation. Included in BOAST is a pressure initialization algorithm, a bubble point tracking scheme, an automatic step control method, and a material balance check on solution stability.

33136 **Pilot microscreen separation of Sclerotium rolfsii biomass and broth.** Griffith, W.L. (Oak Ridge National Lab., TN); Compere, A.L.; Cravens, J.B.; Erickson, P.R. *Developments in Industrial Microbiology;* **22**: 589-597(1981). Contract W-7405-ENG-26.

Field production of scleroglucan biopolymer for micellular flooding near an injection well could eliminate two major polymer production costs, alcohol precipitation of polymer broth and resuspension of dry polymer in water. The use of microscreening could decrease these and another major polymer production cost, that of diatomaceous earth filtration. Bench and pilot tests using Rexnord 1, 6, and 21-μm screens indicate that they provide efficient removal of gross solids from Sclerotium rolfsii culture broth partially diluted to viscosities suitable for field injection. Pilot centrifuge tests indicate that the microscreen backwash could be concentrated to a

solid content of 2 to 3% as volatile suspended solids, suitable for animal feed or by-product use. Although polishing filtration is required to remove residual formation plugging constituents, substantial decreases in capital costs and operating energy appear attainable if microscreening is used. 3 figures, 3 tables.

0204 Processing

REFER ALSO TO CITATION(S) 33160, 33269, 34095

33137 (BMFT-FB-T—83-010) Investigations on hydropyrolysis of heavy crude and residual oil. Schuetze, B. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 153p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750859.

Portions are illegible in microfiche products.

All processes for upgrading of residual oils and heavy crudes have remarkable process disadvantages like catalyst deactivation and undesired products. A hydroprocess appears always reasonable for those kind of oils. In contrast to other hydroprocesses by hydropyrolysis oil is dispersed in hydrogen. The reaction temperature is adjusted between thermal cracking and steamcracking. This way can be described as short-time hydropyrolysis in a spray reactor. Mockup experiments show that the reactor behaves like a combination of continuously stirred tank and plug flow reactor. The hydropyrolysis produces an alkane-rich gas and a liquid rich in aromatics. With appropriate fluid dynamics coke production can be prevented. The conversion of the hydropyrolysis is in a range between hydrotreating and hydrocracking, however with considerable gasification.

33138 (DOE/ET/12385—1) Effect of enhanced-oil-recovery chemicals on crude refining. Final report. Brubaker, I.M.; Hilfman, L.; Malloy, T.P. (UOP, Inc., Des Plaines, IL (USA)). Apr 1983. Contract AC19-78ET12385. 120p. NTIS, PC A06/MF A01. Order Number DE83012473.

The purpose of this project is to study the refining processibility of crude oils produced during enhanced oil recovery (EOR) operations using chemical flooding techniques. Results indicate that: (1) Preparative distillation of crude oils containing surfactants produced several effects depending on the structure of the surfactant and the nature of the crude oil - (a) complete destruction of the surfactant; (b) concentration of the surfactant in the vacuum resid fraction; and (c) complexation of the surfactant with hetero-species in the crude oil and possible concentration in the vacuum resid. (2) The activity of a RCD Unibon (BOC) catalyst was reduced when a vacuum resid fraction with a sodium-containing surfactant was processed. The exchange of sodium by ammonium ion produced a surfactant that did not reduce the catalytic activity. (3) The sodium and surfactant levels in EOR crude oils studied can be reduced by desalting, a typical treatment for whole crude oil. (4) Solvent extraction (Demex) of surfactant-containing vacuum resids produced an oil and pitch comparable in quality to those produced by extraction of virgin resids. The sodium contents of the products of the surfactant-doped resid were higher than the corresponding products from the virgin resids, and the surfactant was not clearly separated into either phase. (5) Low Pressure Coking was not affected by the presence of the sodium sulfonate-containing surfactant in the City of Long Beach vacuum resid. The surfactant was destroyed during the process. (6) The sodium sulfonate-based surfactant in the City of Long Beach crude oil did not have an adverse effect on the fouling properties of the crude oil.

33139 Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion. Muralidhar, G.; Massoth, F.E.; Shabtai, J. (Univ. of Utah, Salt Lake City). *American Chemical Society, Division of Petroleum Chemistry, Preprints;* **27**: No. 3, 722-731(Sep 1982). (CONF-820909—Vol.1).

From National meeting of the American Chemical Society; Kansas City, MO, USA (1 Sep 1982).

Certain Mo and CoMo catalysts supported on a series of SiO_2-Al_2O_3 supports have been characterized by x-ray diffraction and ESCA techniques. The catalysts showed a decline in hydrodesulfurization (HDS) and hydrogenation (HYD) activity with increasing SiO_2 content in the support. For the Mo/SiO_2-Al_2O_3 series, results indicated a high degree of dispersion of Mo on catalysts containing a high proportion of Al_2O_3; however, ESCA results showed low dispersion of Mo for the SiO_2-supported catalysts indicating three-dimensional crystallites. Similar ESCA results were obtained for the CoMo catalysts. There is some reason to believe that two phases may also be present in the Mo/SiO_2 catalyst and that the calculated crystallite size is an average if large and small crystals with x-ray diffraction detecting only the larger ones. Some discussion is presented of the mechanism of the reactions at active sites on the catalysts. (BLM)

33140 Effect of additives to iron oxide in the selective oxidative dehydrogenation reactions. *Journal of Catalysis;* **69**: 506-510(1981).

Results of studies of the effects of additives such as Cr or Zn and the crystal structure of the Fe_2O_3 catalysts in the oxidative dehydrogenation of cis-2-butene are presented. In addition to bulk structure stabilization of the catalyst by the additions, the additives were found to also stabilize the near-surface region which results in a reduction of CO_2 production. The addition of Zn converts the catalyst into a spinel structure which generates surface cation vacancies resulting in improved butdiene production. A similar explanation is offered for the better performance of γ-Fe_2O_3 than α-Fe_2O_3. (BLM)

33141 Further developments in the nickel/urania/α-alumina catalyst system. Nicklin, T.; Farrington, F.; Whittaker, R.J. *Institution of Gas Engineers Journal;* **10**: No. 3, 151-163(May 1970).

Effect of urania (uranium dioxide) on nickel/alumina catalysts, when used in the steam-reforming of hydrocarbons has been described and previously, see Engineering Index 1968 p 1117-18. Further physico-chemical examinations of the catalyst have shown that it may be considered a multifunctional system in which one type of active center prevents the accumulation of carbonaceous deposits. In order to eliminate completely the problems associated with the use of potassium in steam reforming catalysts, the system was neutralized by the addition of nonvolatile alkaline compounds. 16 references.

0205 Products And By-products

REFER ALSO TO CITATION(S) 33165

0206 Health And Safety

33142 (SCP-R—2-64-25) Risk analysis - safety program. Summary report. Oerjasaeter, O. (Scandpower A/S, Oslo (Norway)). Jan 1981. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750550.

The general structure of a risk management system model is established as a basis for identifying necessary elements of a safety program for offshore petroleum activities. According to this risk management model, a safety program should be structured and detailed so as to secure the adequacy and fitness of the analytical/administrative "feedback system" based on the following main elements: legislation, guides and regulations; safety goals/policy; acceptability criteria; risk identification/estimation (risk analysis); risk evaluation; safety and emergency requirements; risk control, comprising specification, realization and supervision/control/documentation of safety measures; information and experience basis; analysis of actual incidents/accidents. The risk management model is applied systematically in the preparation of a more specific safety program for exploration drilling projects. Some recommendations are given as to further applications.

33143 (SCP-R—2-64-28) Risk analysis, gas and oil leakages. Brakestad, H. (Scandpower A/S, Oslo (Norway)). Dec 1981. 79p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750551.

Portions are illegible in microfiche products.

In the process train of offshore production installations, leakages from flanges and gaskets are belived to be one of the most significant contributors to the overall risk. The potential hazards

from leakages are fires and explosions. Based on failure frequency data for the connections, comparative risk analysis were to be carried out to show the risk contribution from the different connection methods. The performed analysis has shown, however, that the available failure data for mechanical components in offshore use have a low quality and are consequently a limiting factor for comparing different designs and construction solutions with respect to reliability. In addition to the need for improved data it should be recognized that, in order to reach a more presice conclusion concerning the ranking of different methods for mechanical connections in the process trains, a cost benefit analysis including the maintenance aspects as well as the reliability aspect has to be performed. With the assumptions made for the consequence chains following the leakage/rupture, it is found that the different ventilation system designs may have substantial influence on the risk connected to leakage and rupture in a module on an offshore oil/gas production platform. It is, however, difficult with a reasonable confidence to present a ranking between the different ventilation systems because each design has both advantages and disadvantages in connection with the different leakage categories. From a human risk point of view it might be concluded from the simplified risk evaluation performed, that separate mechanical ventilation of each module is the best solution. 28 drawings, 20 tables.

33144 **(STF—88-A81017) Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms.** Schmidt Pedersen, K. (Otter Group, Trondheim (Norway)). Jun 1981. 123p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750549.

Portions are illegible in microfiche products.

This is the first report of three, coming from a project carried out by The Ship Research Institute of Norway and The Norwegian Fire Research Laboratory. The goal of the project is to find optimum ways and methods to extinguish or control fire fighting agents or media on board typical offshore production platforms. The first report establishes the probable accidents or events and specify the loads resulting from them. The situations are described as event trees where the design basis accident(s) can be chozen by the personnel performing the design approval. In the report it is concluded what the author considered to be the critical event. The basic concept of the report is the calculation of the accident loads and duration on every significant step of a fire and/or explosion development from seven different start events on two different platform concepts, the open concept involving natural ventilation, and the closed consept involving forced ventilation. The calculated parameters are leakage rates, flashing ratios of gas from two phase flows, gas concentration build up rates, burning rates, fire durations, radiation intensities, convective heat loads, explosion overpressures, pressure loads leading to collapse of different elements, explosion venting area and needed air supply for combustion. The events can be divided into the following categories: Jet fires, pool fires, fires in running liquids, fire balls, gas fires, ventilation controlled fires in enclosures, deflagrations or combinations of these. Leaks of hydrocarbons from flanges and valves are established as start events. Fires in a blowout are not included. 16 drawings, 1 table.

33145 **(STF—88-A81033) Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires.** Jakobsen, J.I.; Brandt, OE.; Schmidt Pedersen, K. (Otter Group, Trondheim (Norway)). Oct 1981. 118p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750548.

Portions are illegible in microfiche products.

The Ship Rese=h Institute of Norway and the Norwegian Fire Researc arch Laboratory have carried out a project, the aim being to find optimum ways and methods to extinguish or control fire and explosion situations using fire fighting agents on board typical offshore production platforms. The report is giving conclusions on the capability of different fire fighting agents based on updated knowledge and data from manufacturers and research institutions. The capability in different situations is described for each agent or media according to specified criteria and mode of operation: Cooling the fuel surface, cooling of flames or gas phase, cooling of the exposed object(s), attentuation of the radiation loads, securing or blanketing the fuel surface, obstructuring heat feedback to the fuel surface, dilute potential fuel either in the gas or liquid phase to obstruct ignition, choking or displacement of oxygen, combustion reaction inhibiting and creating of an inert atmosphere to obstruct ignition. The main criteria are the needed capacity to reach control or extinguishment in specified situations, that is when heat loads burning rates and durations of the fires are given. Other important criteria are: time of action before control is reached, limitations of the agent or system, toxicity of the agents, price, availability and durability of the agent during storage. The validity of the documentation given by scientists and manufacturers is considered. 22 drawings, 36 tables.

0207 Marketing And Economics

REFER ALSO TO CITATION(S) 33160, 33842, 33851, 33854

33146 **(DOE/EIA—0383(82)) 1982 annual energy outlook: with projections to 1990.** (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Apr 1983. 255p. NTIS, PC A12/MF A01. Order Number DE83011947.

This report presents an analysis of energy trends and projections for the 1980's, both international and domestic. These forecasts are part of a series of Energy Information Administration analyses dating from 1976. The report is characterized by two major themes. First, the higher energy prices that occurred in the 1970's result in a projection of lower per capita energy use and greater energy efficiency during the 1980's. Although some energy prices may fall over the next few years, end-use prices are not projected to return to the levels of the early 1970's. Projected consumption levels reflect continued adjustment to the higher general level of energy prices. Against this background, however, a second important theme involving the relative prices of oil and natural gas emerges. While there has been a substantial movement from oil to (cheaper) natural gas, the projections suggest a reversal of this trend as natural gas becomes more expensive and oil prices fall.

33147 **(DOE/PE/70041—T1) Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry.** (Hagler, Bailly and Co., Washington, DC (USA)). Mar 1982. Contract AC01-79PE70041. 89p. NTIS, PC A05/MF A01. Order Number DE83011528.

The purpose of this study is to determine the costs of cogenerated electricity produced by systems using oil and gas and to compare these costs with the costs of a new utility baseload coal-fired power plant. In conducting this study, three main tasks were carried out. First, researchers characterized the cogeneration and corresponding noncogeneration systems to be addressed in this study. For each cogeneration and corresponding noncogeneration system alternative, technical performance and economic performance were specified. Next the regulatory/financial assumptions necessary to determine the levelized annual costs of cogenerated electricity, including costs of capital, property tax rates, income tax rates, and investment tax credit rates were developed. Finally, in determining the cost of producing cogenerated electricity, the stability of the estimates were evaluated by defining scenarios. Analytical results are discussed separately for the two basic cogeneration system configurations addressed in this study: combustion turbine/heat recovery boiler fueled by natural gas; and gasifier/combustion turbine/heat recovery boiler fueled by heavy crude oil. Findings show that it is unlikely that small crudeoil gasifier combustion turbine systems will be installed in EOR applications. Thus, with industry ownership, the natural gas-fired combustion turbine with a waste-heat recovery boiler is more likely to be used in most steam EOR applications.

33148 **(NP—3770057) Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs.** (Fachverband der Erdoelindustrie Oesterreichs, Vienna (Austria)). 1981. 24p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770057.

This progress report informs on the activities of the petroleum industry in the year 1981 in the fields of exploration and development well activities, production and processing. It also informs on the Austrian consumption of petroleum products and the activities of this industrial association.

0208 Waste Management

REFER ALSO TO CITATION(S) 33058, 33088, 33157

33149 (CONF-820418—, pp 301-306) **Solvent extraction of polychlorinated biphenpyl.** Makarewicz, M.A. (Oak Ridge Y-12 Plant, TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Laboratory studies conducted at the Oak Ridge Y-12 Plant indicate that two solvent extraction processes for the removal of polychlorinated biphenyl (PCB) from mineral oil are effective in reducing the PCB concentration to less than 5 ppM. Both processes, with slight modifications, are capable of processing a variety of oil streams contaminated with either PCB or other chlorinated hydrocarbon contaminants as well as PCB-contaminated soil. Pilot plant data are being obtained to demonstrate the processes and to evaluate the economic feasibility. Preliminary estimates show the processes to be portable and comparable in cost to other removal processes.

33150 (CONF-820418—, pp 307-313) **Polychlorinated biphenyl chemical destruction processes.** Napier, J.M. (Oak Ridge Y-12 Plant, TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Laboratory studies have been conducted at the Oak Ridge Y-12 Plant to evaluate three chemical destruction processes for removal of polychlorinated biphenyl (PBC) from waste oils. These tests have shown that PCB can be destroyed using sodium glycol reagent, sodium naphthalide solution, and a proprietary process called PCBX. In most tests, PCB was reduced to less than 5 $\mu g/g$ in a transformer oil, a lubricating oil, and a mixture of waste oils. Cost estimates for each process were not determined but are believed to be similar to the cost of the PCBX process which is in the range of $0.80 to $2.64 per L ($3 to $10 per gal), depending on the PCB concentration and other variables.

0209 Environmental Aspects

33151 (CONF-820418—, pp 285-291) **PGDP dike testing program.** Conrad, M.C.; Shell, S.L. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Secondary containment is provided for major oil and chemical storage tanks at all UCCND facilities. This and other spill prevention efforts have been established to ensure compliance with environmental regulations and to maintain the favorable public image as a responsible industry. Recent testing of PGDP secondary containment facilities indicates that a substantial number of dikes are inadequate for their intended purpose. This paper recommends dike performance criteria and describes a suggested testing program to document the adequacy of secondary containment facilities.

33152 (IVL-B—678) **Effects of the water soluble fractions of oil from the tanker Sefir on the myside, Neonmysis integer.** Laughlin, R.; Linden, O. (Instituet foer Vatten- och Luftvaardsforskning, Karlskrona (Sweden)). May 1982. 55p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750520.

The tanker Sefir sank in 50 m of water in the southern Baltic Sea in February, 1981. After raising of the ship samples of the cargo oil, a light fuel, were collected for the experiments reported here. Mysid shrimp, Neomysis integer, were acclimated to 4 temperatures and exposed to water soluble fractions (WSF) of the oil under two different regimes. The first a chronic exposure scheme, employed hydrocarbon levels in the parts per trillion range and laste 2 weeks. The second, acute exposure, employed high ppb levels and exposure occured during determination of physiological parameters. Oxygen consumption, ammonia excretion rates, and computed oxygen-nitrogen (O:N) ratios were determined. Oxygen consumption was strongly influenced, and ammonia excretion less strongly influenced by temperature. Chronic exposure for 2 weeks to aromatic petroleum hydrocarbons at the parts-per trillion level did not significantly affect the parameters measured. Exposure to WSF at concentrations between ca. 200 and ca. 1000 ppb produced in oxygen consumption and decreases in ammonia excretion which were heavily influenced by temperature with the greatest effect of oil exposure at 21.5 degrees C, the highest temperature. Laboratory rearing conditions were shown to affect the parameters measured in a quantitative but not qualitative fashion.

33153 (NSFI-OR—221-21281-53-04) **Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf.** Bern, T.I.; Rausand, M. (Norges Skipsforskningsinstitutt, Oslo). Dec 1981. 36p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750552.

The project has reviewed available reports concerning blowouts, and the probability of blowout, to compare and update the historical background. From a statistical point of view, one must stress the weakness of the data material, since one only has reliable data from the Gulf of Mexico and the North Sea areas. The weakness of the data material poses limitations on how reliable the conclusions are. With these limitations in mind, these conclusions can be drawn: The authors recommend not to distinguish between the blowout frequencies on the U. S. Outer Contintal Shelf and in the North Sea area under any phase of offshore activities. The frequencies distributed on the phases of a wells life can be estimated to: Exploration drilling $6.3x10^{-3}$ - $1.4x10^{-2}$ blowout per well; development drilling $1.6x10^{-3}$ - $3.9x10^{-3}$ blowout per well; production $4.5x10^{-5}$ - $2.0x10^{-4}$ blowout per well year; workover $1.2x10^{-4}$ - $3.3x10^{-4}$ blowout per well year. On the Norwegian Continental Shelf one expects 5 - 6 blowouts during the period 1982-90. Of these one could occur during production drilling and one during production/-workover. Vented volumes of hydrocarbons during an imagined North Sea blowout are given based on the sources. The figures are estimated for average wells on Ekofisk and Statfjord. 12 tables.

33154 (NSFI-R—97-80) **Hydrodynamics of underwater blowouts.** Fanneloep, T.K.; Sjoeen, K. (Norges Skipsforskningsinstitutt, Oslo). Jan 1980. 52p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750553.

Portions are illegible in microfiche products.

The hydrodynamic structure of deep-set underwater bubble plumes is studied with reference to thermal plume theory. Two effects are of particular interest; the gas expansion with decreasing hydrostatic pressure and the strong influence of variable bouyancy on relevant plume parameters, the interaction with free surface which results in a rapid radial surface layer. The gross features are verified by experiments at 5.5m and 10m depths. Gaussian similarity is observed. Available laboratory data and results from a field experiment at 60m depth, are correlated based on a modified plume theory including variable bouyancy. Engineering formulae for the horizontal surface layer are also checked against the new experimental results. The surface interaction zone is quite shallow, but of great importance when considering the fate of the oil on the surface. A jetlike radial layer is generated close to the surface and which extends a considerable distance from the blowout point. The large area and the small thickness of the slick make containment and collection more difficult than in the case of an equivalent surface spill. In designing equipment and in contingency planning to combat underwater blowouts, it is of interest to know the extent and thickness of the oil slick for various environmental conditions. For this purpose the reported hydrodynamic analysis has been developed. 26 drawings, 1 table.

33155 (PB—83-159475) **Ecological study of the 'Amoco Cadiz' oil spill.** (National Oceanic and Atmospheric Administration, Rockville, MD (USA)). Oct 1982. 481p. NTIS, PC A21/MF A01.

Physical, chemical, and microbiological studies were made after the Amoco Cadiz oil spill. Microbial degradation was found within sediments impacted by the Amoco Cadiz oil spill. Laboratory simulation was carried out of the microbiological degradation of crude oil in a marine environment. The analytical chemistry program is discussed. Studies were made of hydrocarbon concentrations at the Ile Grande and Baie de Lannion stations polluted by the wreck of the Amoco Cadiz. Hydrocarbons present in the sediments in the Aber Wrac'h Estuary were determined. Distribution

and evolution of oil pollution in marine sediments and anaerobic sediments are considered.

33156 **(PB—83-159889) Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83.** Morris, B.F. (National Marine Fisheries Service, Juneau, AK (USA). Alaska Region). Jan 1981. 243p. NTIS, PC A11/MF A01.

This report assesses certain commercial and biological uses of the Navarin Basin that may be at conflict from petroleum development, documents the national and international importance of the area's renewable living resources, and proposes recommendations on further research needs to minimize and avoid potential resource-use conflicts.

0220 Transport, Pipelines, And Handling

REFER ALSO TO CITATION(S) 33084

0230 Properties

REFER ALSO TO CITATION(S) 33129

0240 Storage

REFER ALSO TO CITATION(S) 33129

33157 **(DOE/NBM—3012249) Strategic Petroleum Reserve and brine-disposal problem.** (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). 10 Jan 1979. 37p. NTIS, PC A03. Order Number DE83012249.

Paper copy only, copy does not permit microfiche production.

It was the general feeling of the study group that many of the current problems were a result of: (1) an initially poor understanding of the technical aspects and the importance of the environmental issues, (2) the relative magnitude of the Strategic Petroleum Reserve (SPR) program when compared to all of industry's past efforts, and (3) the setting of very ambitious goals (which were subsequently made even more ambitious) in the pursuit of the DOE's total energy program. Technical recommendations relative to the brine disposal problem are included in Appendix C. In conclusion, the study group felt: (1) in the short term, the important problems are understood, solutions are identified and implementation is under way; (2) for the longer term, the plan to award turnkey contracts would alleviate all of the early management problems identified in this report with the exception of the processing of environmental approvals. The study group recommends that strong single-point project management be established, supported by complete management information and flexible planning systems. Then new problems may be addressed as they arise. Future planning should include anticipated problems in a what if fashion; alternative solutions for each anticipated problem should be defined and considered.

0250 Combustion

REFER ALSO TO CITATION(S) 33088

03 NATURAL GAS

REFER ALSO TO CITATION(S) 32954, 32955

0301 Reserves

REFER ALSO TO CITATION(S) 33097

0302 Geology And Exploration

REFER ALSO TO CITATION(S) 33102, 33167

33158 **(DOE/MC/08060—T1) Eastern Gas Shales Project. Corning and Logging Plan.** (TRW Energy Systems Planning Div., McLean, VA (USA)). Mar 1977. Contract AC21-76MC08060. 69p. NTIS, PC A04/MF A01. Order Number DE83012407.

The Coring and Logging Plan (CLP) is a device to implement parts of the field operations, physical characterization and geochemical characterization work packages of the Eastern Gas Shales Project. The Eastern Gas Shales Project (EGSP) is a multi-year project initiated by the US Energy Research and Development Administration (ERDA) to stimulate natural gas production in the Eastern Petroliferous Basins. The specific orientation of the project is toward determining the gas reserves within the Devonian shale, thoroughly characterizing the shale, and advancing the technology of gas exploration and production. This coring and logging plan contains a work breakdown structure (WBS) which generically details the logical reduction of the various operations involved. It also contains event sequence diagrams which can be used by the respective work package managers to define and schedule the specific tasks which will implement the planned objectives. Appended to the plan are the coring and logging logistics plans and procedures for sampling, for the core physical laboratory and for the petrographic and geochemical analysis laboratory. The laboratory and sampling procedures were prepared by MERC.

0303 Drilling, Production, And Processing

REFER ALSO TO CITATION(S) 33134, 33167

33159 **(DOE/R4/10371—T1) Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama.** (Alabama Univ., University (USA). School of Mines and Energy Development). Sep 1982. Contract FG44-81R410371. 81p. NTIS, PC A05/MF A01. Order Number DE83009820.

Portions are illegible in microfiche products.

The BF Goodrich Tire and Rubber Company of Akron, Ohio operates a large tire manufacturing plant in Tuscaloosa, Alabama, which consumes approximately 3000 MCF of natural gas daily in generating steam for the manufacturing process. In addition, Goodrich has other facilities with requirements for gaseous fuels. Because of increased costs and interruptibility of conventional gas and oil, Goodrich is investigating alternative sources for energy. Goodrich has been analyzing the possibility of obtaining methane gas from coalbeds. In this process, the United States Bureau of Mines, The University of Alabama School of Mines and Energy Development and various coal mining companies have experience in coalbed degasification. A test well was drilled and analyses performed to verify this potential. Our management was contemplating investing Goodrich capital in developing production wells if the test well analyses indicated such development to be feasible and the economics of production were consistent with our corporate objectives for return on investment. Our analyses indicate that investment in this program is not justified at this time. 20 figures, 13 tables.

0304 Products And By-products

33160 **(NE-BF—82-8) Updating of costs for production of methanol from natural gas and vacuum residue feedstock.** (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jan 1982. 72p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750486.

Portions are illegible in microfiche products.

The National Swedish Industrial Board has requested Trichem to prepare a study updating the cost for production of methanol from natural gas and vacuum residue. This cost was to be com-

pared with the cost for production of gasoline from cat-cracking of heavy fuel-oil. Based on 1981 feedstock prices the cost of producing gasoline by the cat-cracking is estimated to be 307.9 dollar per ton and the cost for methanol from vacuum residue is 307.5-315.9 dollar per ton and from natural gas 299.5 dollar per ton. 1 ton of motor gasoline is equivalent to 1.584 tons of methanol when used as a motor fuel. Methanol would have to be produced for 194.4 dollar per ton to compete with cat-cracked gasoline. The cost of producing gasoline from heavy fuel oil could well move in a downward direction whereas methanol production costs can only move in an upward direction.

0305 Health And Safety

REFER ALSO TO CITATION(S) 33142, 33143, 33144, 33145

0306 Marketing And Economics

REFER ALSO TO CITATION(S) 33098, 33146, 33148, 33159, 33160, 33842

33161 **(DOE/EIA—0130(83/04)) Natural gas monthly.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Apr 1983. 104p. NTIS, PC A06/MF A01. Order Number DE83011655.

Portions are illegible in microfiche products.

This document highlights activities, events, and analysis results of interest to public and private sector organizations associated with natural gas industry operations. Data highlights: (1) Marketed production of natural gas during February 1983 was estimated at 1387 billion cubic feet (Bcf), 178 Bcf (11.4 percent) below the February 1982 level; (2) Consumption of natural gas during February 1983 was an estimated 1709 Bcf, a decrease of 258 Bcf (13.1 percent) compared to February 1982 consumption; (3) Consumption declined in all market sectors in January 1983 compared to January 1982; (4) The volume of working gas in underground storage reservoirs at the end of February 1983 was 31.7 percent above the February 28, 1982 level; (5) The average wellhead price of natural gas in December 1982 was $2.56 per thousand cubic feet (Mcf). In December 1981 the average was $2.16 per Mcf; (6) In February 1983, the US city average residential price for 100 therms of natural gas was $59.99; and (7) The average wellhead (first sale) price for natural gas purchases projected for March 1983 by selected interstate pipeline companies was $2.79 per Mcf. The feature article in this issue is entitled Recent Trends in Natural Gas Well Costs. Information is presented under the headings: industry overview, explanatory notes, data sources, and selected recurring natural gas and related reports. 5 figures, 24 tables. (DMC)

33162 **(DOE/EIA—0366) Natural gas market through 1990.** O'Neill, R.P.; Kurator, W.G.; Mariner-Volpe, B. (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). May 1983. 156p. NTIS, PC A08/MF A01. Order Number DE83011891.

Portions are illegible in microfiche products.

This report is the fourth in a study of the Natural Gas Policy Act of 1978 (NGPA), in which the Energy Information Administration (EIA) seeks to provide information and analysis describing the effects of the NGPA and proposed changes. It presents an analysis of natural gas wellhead price deregulation, comparing the projected results under the current NGPA decontrol schedule with those under three alternatives: the Administration proposal, entitled the Natural Gas Consumer Regulatory Reform Amendments of 1983; an alternative phased decontrol; and continuance of the current NGPA price ceilings indefinitely. The possible consequences of the alternative policies through 1990 are discussed along with the impacts of key assumptions on the NGPA projections. The four cases in this report are specified. Those associated with the downstream market, that is, the distributors and the consumers, generally favor the regulation of wellhead prices. The continued controls case extends price controls indefinitely. Most producers and some groups representing large industrial users favor wellhead price decontrol. The Administration proposal effectively allows all gas to be deregulated by 1985 by allowing any party to a contract to abrogate the contract if it is not renegotiated prior to January 1, 1985, while the phased decontrol case raises price ceilings on all gas until 1985 when all gas is decontrolled. Pipeline companies have expressed concern over the potential fly-up in the wellhead price when gas is decontrolled.

0308 Environmental Effects

REFER ALSO TO CITATION(S) 33153, 33154

0309 Artificial Stimulation

REFER ALSO TO CITATION(S) 33135

0310 Legislation And Regulation

33163 **(DOE/PE—0046) Supplemental analysis of natural-gas-consumer regulatory-reform legislation.** (USDOE Office of Policy, Planning and Analysis, Washington, DC). May 1983. 59p. NTIS, PC A04/MF A01. Order Number DE83011938.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This paper is supplemental to the Department of Energy's February 28, 1983, study entitled Analysis of Natural Gas Consumer Regulatory Reform Legislation. This supplemental analysis was undertaken to show the energy and price effects of natural gas reserve additions attributable to deregulating the price of old gas. this paper includes a comparison of the energy and price effects of the Natural Gas Policy Act (NGPA) and the Administration's natural gas bill (the Natural Gas Consumer Regulatory Reform Amendments of 1983, S 615), as well as an analysis of two other recent legislative proposals on natural gas: H.R. 2154, introduced by Representative Gephart, and S. 689, introduced by Senator Heinz.

0320 Transport, Pipelines, And Handling

33164 **(CONF-830550—1) There's more to erosion control than protecting the pipe.** Carter, R.P.; Cahill, C.A.; Johnson, D.O. (Argonne National Lab., IL (USA); Gas Research Inst., Chicago, IL (USA)). 1983. Contract W-31-109-ENG-38. 15p. NTIS, PC A02/MF A01. Order Number DE83011727.

From American Gas Association operating section transmission conference; Seattle, WA, USA (2 May 1983).

Planners for the gas-transmission industry must clearly understand the principles and applications of techniques for the control of soil erosion and sedimentation during and after installation of pipelines. The two main forms of erosion - upland, and stream bank and channel - are each influenced by a different set of variables and thus must be attacked by different techniques. Estimates of potential soil loss by upland erosion may be made by using the Universal Soil Loss Equation; erosion-prone areas are quickly identified in this way. Various combinations of vegetative, mulching, chemical, and physical approaches can then be selected to prevent or minimize erosion. In controlling erosion along stream banks and channels (essential at pipeline crossings), revetments, dikes, and pilings are used. Whatever the problem, it is essential that potential erosion be identified in the early planning stages. Both time and money will be saved by anticipating the problem and being prepared to counter it with the proper techniques during and after construction.

33165 **(DOE/EV/10502—1) Feasibility study of a sealed safety monitor for trucks carrying LNG and other hazardous materials.** Croce, P.A.; Larocque, G.; Long, M.H.; Bendixen, L.M. (Little (Arthur D.), Inc., Cambridge, MA (USA)). Dec 1982. Contract AC01-81EV10502. 149p. NTIS, PC A07/MF A01. Order Number DE83011500.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report describes the development of a conceptual design of a sealed safety monitor (SSM) to be utilized on tank trucks. The device which observes selected vehicle operating parameters, would warn the operator that operational safety param-

eters were being exceeded. Feasibility is investigated for the SSM applied to LNG trucking operations, although its usefulness to trucking of all hazardous materials is considered. Despite difficulty in obtaining critical accident scenarios from existing data bases, certain key scenarios were identified from discussions with various agencies and organizations. A simplified theoretical analysis for a SSM applied to these scenarios indicated technical feasibility, and a preliminary design was conceived. A trailer-based approach was employed in order to minimize developmental and implementation costs and to provide an effective system for truck fleets where tractors and trailers are commonly interchanged. Positive and negative factors relating to the implementation of a SSM are identified. Prototype development and testing is recommended, although some legal and acceptance issues will need to be addressed before a successfully developed SSM can be used in the field.

0330 Properties

33166 **(DOE/ET/12138—1341-Vol.1) Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1.** Evans, M.A. (West Virginia Univ., Morgantown (USA). Dept. of Geology and Geography). Jan 1980. Contract AC21-76ET12138. 115p. NTIS, PC A06/MF A01. Order Number DE83008494.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Examination of thirteen oriented Devonian-shale cores from the Appalachian Basin revealed considerable fracturing and shearing at depth. Fracture frequency and orientation measurements were made on the fractures in each core. Fractures and associated structures were differentiated into core-induced fractures, unmineralized natural fractures, mineralized natural fractures, slickensided fractures, and slickenlines. Core-induced fractures exhibit a consistent northeast orientation both areally and with depth. This consistency indicates the presence of an anisotropy which is interpreted to be related to an east to northeast trending maximum compressive stress developed in eastern North America by the convective flow in the mantle associated with spreading along the Mid-Atlantic Ridge. Natural fracture, slickenside, and slickenline orientations are related to: (1) northwest directed tectonic compressive stresses associated with Alleghenian deformation, (2) stresses associated with local faulting, and (3) the same east to northeast maximum compressive stress responsible for the core-induced fractures. Higher frequencies of natural fractures and slickensides are associated primarily with incompetent, high-organic shales. Natural fractures occur most frequently in the Marcellus Shale, Tully Limestone, Geneseo Shale, West Falls Formation, and the Lower Huron Member of the Ohio Shale. Slickensided fractures occur most frequently in the Marcellus Shale, Tully Limestone, Geneseo Shale, West Falls Formation, base of the Java Formation, and Lower Huron and Cleveland Members of the Ohio Shale. These observations are consistent with a fracture facies concept that proposes fracture development in shales that have acted as decollement zones during Alleghenian deformation. Detailed reports are included in Volume 2 for each of the thirteen cores investigated. 25 figures, 4 tables.

33167 **(DOE/ET/12138—1341-Vol.2) Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices.** Evans, M.A. (West Virginia Univ., Morgantown (USA). Dept. of Geology and Geography). Jan 1980. Contract AC21-76ET12138. 225p. NTIS, PC A10/MF A01. Order Number DE83008483.

Thirteen cores from wells located throughout the Appalachian Basin were examined. Volume 2 contains self-contained reports summarizing fracture data obtained on each of the cores. Each report discusses, in detail, the fracture types and fracture patterns described in that particular core, and it relates the fractures to local structure and regional tectonics. A brief discussion of gas production from the Devonian shale in the well is also included in each report.

04 OIL SHALES AND TAR SANDS

REFER ALSO TO CITATION(S) 32954, 32955

0401 Reserves And Exploration

REFER ALSO TO CITATION(S) 33158

0402 Site Geology And Hydrology

REFER ALSO TO CITATION(S) 33167

33168 **(DOE/LC/10916—T1) Review of reported tar-sand occurrences and recent projects in Wyoming.** Clark, M.; Glass, G.B. (Wyoming Geological Survey, Laramie (USA)). May 1983. Contract AS20-82LC10916. 52p. NTIS, PC A04/MF A01. Order Number DE83011736.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A synopsis is presented of 78 reported occurrences of shallow, oil-impregnated rocks in Wyoming many of which may be tar sands. (Appendices A and B). In most cases, there are only sketchy descriptions of these occurrences, scattered throughout the literature. This paper is a prelude to much needed studies and evaluations of these individual deposits. In addition, brief descriptions of three recent extractive operations are presented.

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 33137, 33139

33169 **Metal corrosion in oil shale retorts.** Levy, A.V. (Lawrence Berkeley Lab., CA). pp 421-475 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC03-76SF00098.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

A program was conducted to determine the behavior of candidate steel alloys in in-situ and above-ground oil shale retort environments. Components from oil shale retorts as well as metal specimens exposed in the retorts were analyzed. Laboratory crucible test exposures were also made and analyzed. It was determined that the high-sulfur content, reducing environment of in-situ retorts can catastrophically attack low alloy and stainless steels at temperatures near 1000°C (1800°F). In the lower temperature, near 540°C(1000°F), operating environments of above ground retorts, both low alloy and stainless steels undergo $<$ 20 mils/y corrosion rates. 32 figures.

0405 Properties And Composition

REFER ALSO TO CITATION(S) 33166, 33167

0409 Waste Research And Management

33170 (LBL—15816, pp I.2-I.18) **Rapid fractionation of oil shale wastewaters by reverse-phase separation.** Daughton, C.G.; Jones, B.M.; Sakaji, R.H. Dec 1982. NTIS, PC A08/MF A01.

In Quantitation of oil shale wastewater quality. A manual of analytical methods.

A new fractionation procedure has been developed which effects a crude separation of solutes from complex oil shale wastewaters, but which is also simple, rapid, and applicable to other types of aqueous wastes. This method separates a wastewater into polar (hydrophilic) and nonpolar (hydrophobic, lipophilic) fractions by passing the sample through a disposable reverse-phase chromatographic cartridge. This approach is reverse-phase frac-

tionation (RPF). The method is rapid, and alteration or contamination of the sample is minimized. This crude fractionation step greatly increases the information that can be derived from the subsequent application of colligative detection methods. Moreover, these fractions (especially the colligative detection methods. Moreover, these fractions (especially the hydrophilic fraction) themselves can be directly subjected to experimental treatments (such as biooxidation or physicochemical treatment) for comparison with parallel treatments of the raw unfractionated water.

33171 (LBL—15816, pp II.1-II.54) **Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation.** Langlois, G.W.; Jones, B.M.; Sakaji, R.H.; Daughton, C.G. Dec 1982. NTIS, PC A08/MF A01.

In Quantitation of oil shale wastewater quality. A manual of analytical methods.

The routine quantitation of organic or total carbon (OC and TC, respectively) in aqueous samples is generally achieved after stoichiometric conversion of each carbon atom into identical unit-carbon molecules by chemical/photochemical oxidation or high-temperature combustion followed by detection with nondispersive infrared spectroscopy (IR), flame ionization (FID), or coulometric titrimetry. The quantitation of OC and TC in synfuel process wastewaters presents several major problems to various conformations of instruments designed for the conversion and detection steps. A carbon analyzer was fabricated from commercially available units and parts. This new approach to carbon analysis couples an ultraviolet photochemical reactor with an automatic coulometric titrator. This carbon analyzer was compared statistically with an ASTM-approved high-temperature combustion system. The CO_2 that was generated from each oxidation unit was quantitated by coulometric titrimetry. Low-temperature uv-enhanced persulfate oxidation of pure compound standards compared favorably with the recoveries from the pure compound standards compared favorably with the recoveries from the ASTM-approved combustion unit. Results of a two-way analysis of variance indicated there was no significant difference between analyzers for recovery of pure compounds ($\alpha = 0.05$). Neither was there a significant difference in total or dissolved organic carbon values from each of the two types of analyzers ($\alpha = 0.05$) for nine oil shale process waters.

33172 (LBL—15816, pp III.1-III.22) **Colorimetric and titrimetric quantitation of ammonia in oil shale wastewater.** Daughton, C.G.; Cantor, J.; Jones, B.M.; Sakaji, R.H. Dec 1982. NTIS, PC A08/MF A01.

In Quantitation of oil shale wastewater quality. A manual of analytical methods.

Ammonia gas is soluble in water as a hydrated form, and an equilibrium can be established with its protonated form, ammonium ion, as dictated by its pK/sub a/ (9.3 at 25°C). Ammonia and ammonium ion are present in wastewater from oil shale retorting at concentrations generally greater than several thousand parts per million. Methods for the quantitation of these species in synfuel wastewaters are necessary for research, treatment monitoring, and establishment of regulatory standards. Only three approaches are available to a routine wet-chemistry laboratory for quantitating the aqueous equilibrium pair as total ammonia: (1) colorimetry, (2) titrimetry, and (3) direct ammonia-selective electrode. Only these three routine methods were extensively evaluated for oil shale wastewaters. Methods for colorimetry and acidimetric titrimetry proved comparable for accuracy. Gas-sensing electrodes from two manufacturers proved to be extremely unreliable even though they could possibly provide the fastest and easiest means of quantitation. Ammonia-sensing electrodes generate unstable response curves in oil shale retort waters, probably because their membranes become easily fouled and because surfactants (e.g., fatty acids) increase the membrane permeability to other interfering solutes. For these reasons, a study was performed for the statistical comparison of only two methods, colorimetry and automated acidimetric titrimetry, on nine oil shale wastewaters.

33173 (LBL—15816, pp IV.1-IV.35) **Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters.** Jones, B.M.; Sakaji, R.H.; Daughton, C.G. Dec 1982. NTIS, PC A08/MF A01.

In Quantitation of oil shale wastewater quality. A manual of analytical methods.

The chemical oxygen demand (COD) test was first applied as a rapid estimator of the biochemical oxygen demand (BOD) of wastewater organic material (Moore, Kroner, and Ruchhoft, 1949). Of numerous possible oxidants, four have been used for determining the oxygen demand of aqueous effluents: potassium permanganate, potassium dichromate, ceric acid, and iodic acid. Of these four, potassium dichromate in sulfuric acid is the prescribed method in the United States. Specific correlations have been developed to relate the COD of a waste to its five-day BOD (Rhame, 1947). The correlations between BOD and COD must be applied with caution because potassium dichromate does not oxidize ammonia; therefore, the COD value does not reflect the contribution of ammonia to ultimate BOD. The routine method for COD determination has been revised (i.e., by the addition of silver as a catalyst) to yield oxidation of certain biodegradable compounds (i.e., aliphatic hydrocarbons, straight-chain alcohols, and fatty acids) that are not fully susceptible to the chemical oxidant. In addition to saving time, the COD test was recognized as being extremely valuable for determining the oxygen demand of wastes that are toxic to microorganisms. Chemical oxygen demand is often determined in lieu of BOD and has achieved an intrinsic meaning separate from its biochemical counterpart.

33174 (LBL—15816, pp V.1-V.14) **Microbial biomass in oil shale wastewaters: quantitation as protein.** Daughton, C.G.; Jones, B.M.; Sakaji, R.H. Dec 1982. NTIS, PC A08/MF A01.

In Quantitation of oil shale wastewater quality. A manual of analytical methods.

The quantitation of microbial growth (i.e., time-dependent increase in biomass concentration in conjunction with cell numbers) is necessary for the accurate assessment of biological waste treatment performance and is essential for execution of valid biodegradation experiments. The increase in biomass at stationary phases is an indirect measure of organic solute degradation; biomass determinations therefore can be used to validate the actual solute removal values that are determined by other means. Values for solute removal and biomass production can then be used to calculate growth yields. Oil shale process wastewaters have several characteristics that preclude the facile measurement of microbial biomass by the more often used methods such as dry cell mass, turbidity, or protein.

0410 Enviromental Aspects

33175 **(LBL—15816) Quantitation of oil shale wastewater quality. A manual of analytical methods.** Daughton, C.G. (ed.). (Lawrence Berkeley Lab., CA (USA)). Dec 1982. Contract AC03-76SF00098. 151p. NTIS, PC A08/MF A01. Order Number DE83011034.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This manual is a compendium of analytical methods for the quantitation of various water quality parameters. Each method is specifically adapted for application to the highly complex sample matrices of the aqueous wastes that are generated by the pyrolytic production of shale oil. These methods have evolved from specific needs of the LBL-SEEHRL Oil Shale Waste Treatment Program.

05 NUCLEAR FUELS

0501 Reserves

33176 **(GJBX—12(83)) National Uranium Resource Evaluation: intermediate-grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado.** Goodknight, C.S. (Bendix Field Engineering Corp., Grand Junction, CO (USA)). Apr 1983. Contract AC13-76GJ01664. 73p. NTIS, PC E04/MF A01. Order Number DE83011303.

Portions are illegible in microfiche products; Includes 2 sheets of 24x reduction microfiche.

Intermediate-grade uranium resources in the Miocene Browns Park Formation were assessed for part of the Maybell district in the Sand Wash Basin, Colorado, as part of the National Uranium Resource Evaluation program conducted by Bendix Field Engineering Corporation for the US Department of Energy. Two sites, each 2 mi^2 (5 km^2) in size, in the district were selected to be assessed. Site selection was based on evaluation of geologic, geophysical, and geochemical data that were collected from a larger project area known to contain uranium enrichment. The assessment of the sites was accomplished primarily by drilling 19 holes through the Browns Park Formation and by using the geophysical and geochemical data from those holes and from a larger number of industry-drilled holes. Analytical results of samples from uranium prospects, mainly along faults in the sites, were also used for the assessment. Data from surface samples and from drill-hole samples and logs of the site south of Lay Creek indicate that no intermediate-grade uranium resources are present. However, similar data from the site north of Lay Creek verify that approximately 25 million lb (11.2 million kg) of intermediate-grade uranium resources may be present. This assessment assumes that an average uranium-enriched thickness of 10 ft (3 m) at a grade of 0.017% U_3O_8 is present in at least two thirds of the northern site. Uranium enrichment in this site occurs mainly in the lower 150 ft (45 m) of the Browns Park Formation in fine- to medium-grained sandstone that contains abundant clay in its matrix. Facies variations within the Browns Park preclude correlation of individual beds or zones of uranium enrichment between closely spaced drill holes.

33177 (USGS—MAP-I-1003) Geology, structure, and uranium deposits of the Marble Canyon 1^0 x 2^0 Quadrangle, Arizona. Haynes, D.D.; Hackman, R.J. (Geological Survey, Washington, DC (USA)). 1978. 30p. NTIS, PC A03/MF A01. Order Number DE83011267.

Portions are illegible in microfiche products.

0502 Exploration

REFER ALSO TO CITATION(S) 33850

33178 (USGS-OFR—78-949) Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks. Grauch, R.I. (Geological Survey, Denver, CO (USA)). [nd]. 30p. USGS, Open File Services, Box 25425, Denver Federal Center, Denver, CO.

Uraninite of Precambrian age occurs locally in and around a massive sulfide deposit at Camp Smith, Westchester and Putnam Counties, New York. The host rocks are believed to be part of a sequence of marine sediments and submarine volcanogenic rocks that were metamorphosed to leucogneisses, amphibolites, and amphobolite gneisses in the granulite facies. Ore grade concentrations of uraninite occur (1) in the outer Cu-Ni-bearing zone of the sulfide body; (2) in magnetite-rich and scapolite-rich layers within amphibolite gneiss; and (3) in amphibole-quartz-feldspar + pyroxene pegmatites. The uranium-rich horizons are generally near the contact between rocks of keratophyre and spilite affinities. It is suggested that the iron oxide, uranium-rich, and sulfide-rich horizons and their host rocks were originally deposited in the distal, volcanogenic, massive sulfide environment.

0503 Mining

REFER ALSO TO CITATION(S) 33850

0505 Enrichment

33179 (UCID—19694) Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures. (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 169p. NTIS, PC A08/MF A01. Order Number DE83012301.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The SISL (Special Isotope Separation Laboratory) forms part of the Advanced Isotope Separation Facility in Building 482. It has two main areas, namely, the Copper Vapor Laser (CVL) area and the Dye Corridor (DC) area. The CVL walls are perpendicular to the DC walls. The former are free-standing, whereas the latter are proposed to be covered by a ceiling which will act as a fire barrier. The Engineering Mechanics Section of NTED was requested by the SISL group to analyze the CVL and DC walls for static load, seismic load, ambient noise, and thermal response. This report presents the results of the analyses and a preliminary design with recommendations. For the CVL walls, both steel frame and reinforced concrete options were considered. The reinforced concrete wall was analyzed as a full-length, free-standing, 18″ thick and 17′ high wall with different combinations of boundary conditions. It was also analyzed as a wall consisting of 14′ segments, fixed at the base. The DC walls are analyzed as 18″ thick, lightweight concrete slab continuous over all four walls. The walls are assumed to be fixed at the floor and hinged to the ceiling slab. It is also realized that the CVL wall, being perpendicular to the DC walls, would contribute to the rigidity of the latter if they are connected at their junction. Therefore, a separate set of analyses is performed for a DC wall-slab assembly hinged to a 7′ long piece of CVL wall.

33180 Generalized computer model of the transient behavior of multicomponent isotope separation cascades. Rutherford, W.M. (Mound Facility, Miamisburg, OH). *Separation Science and Technology;* **16**: No. 10, 1321-1337(1981). Contract AC04-76DP00053.

The time dependent performance of large separation systems is a major consideration in the enrichment of the isotopes of elements that have a direct role in nuclear fuel cycles. The transient behavior of multicomponent separation cascades is described by a set of nonlinear partial differential equations that are similar in form for chemical exchange, distillation, gaseous diffusion, thermal diffusion, and other countercurrent processes. The Mound computer model is set up to solve the differential equations by a fast, implicit forward difference technique. Systems of up to 10 components can be handled with a wide variety of multiple input and output streams. With modifications, the program can be used to model systems of two or more cascades. It has been applied to the separation of the isotopes of uranium, the noble gases, carbon, oxygen, nitrogen, chlorine, sulfur, and calcium. A neon isotope separation problem is given as an example of the precision with which performance can be predicted for multicomponent systems. 7 figures, 1 table.

0507 Fuels Production And Properties

33181 (NUREG—0987) Environmental impact appraisal for renewal of Special Nuclear Material License No. SNM-1168, Docket No. 70-1201. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards). May 1983. 140p. NTIS, PC A07/MF A01 - $GPO $6.50. Order Number DE83902022.

Portions are illegible in microfiche products.

The Babcock and Wilcox Company (B and W) Commercial Nuclear Fuel Plant (CNFP) near Lynchburg, Virginia, produces fuel assemblies for use in commercial light-water reactors. The facility processes low-enriched uranium (max. 4.05% ^{235}U) in the form of UO_2 powder into sintered pellets, encapsulates them in metal tubing, and clusters the tubing into fuel assemblies for shipment. In response to an application by B and W for renewal of Special Nuclear Material (SNM) License No. SNM-1168, the US Nuclear Regulatory Commission (NRC), with the technical assistance of Oak Ridge National Laboratory, prepared this environmental assessment pursuant to Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 to 1508) and NRC regulations (10 CFR Part 51), which implement requirements of the National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190).

33182 Determination of plutonium dioxide surface areas from x-ray crystallite sizes. Stakebake, J.L. (Rockwell International, Golden, CO). *Journal of Catalysis;* **78**: No. 2, 477-481(Dec 1982). Contract AC04-76DP03533.

An empirical relationship between PuO_2 surface areas and the x-ray crystallite sizes is described. This relationship permits the oxide surface area to be determined from the easily measured x-ray crystallite size. Fourteen samples of ground and calcined oxide were used for the analyses. It is shown that as crystallite size decreases the surface area increases and that this change is systematic and predictable.

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 33189, 33190, 34426

33183 **(DP-MS—83-4) Testing and economical evaluation of U(IV) in Purex.** Hoisington, J.E.; Hsu, T.C. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 11p. (CONF-830205—29). NTIS, PC A02/MF A01. Order Number DE83011383.

From Waste management conference; Tucson, AZ, USA (27 Feb 1983).

The use of uranous nitrate, U(IV), as a plutonium reductant in the Purex solvent extraction process could significantly reduce the waste generation at the Savannah River Plant. The current reductant is a ferrous sulfamate (FS)/hydroxylamine nitrate (HAN) mixture. The iron and sulfate in the FS are major contributors to waste generation. The U(IV) reductant oxidizes to U(VI) producing no waste. The Savannah River Laboratory has developed an efficient electrochemical cell for U(IV) production and has demonstrated the effectiveness of U(IV) as a plutonium reductant. Plant tests and economic analyses are currently being conducted to determine the cost effectiveness of U(IV) implementation. The results of recent studies are presented.

33184 **(INIS-mf—7685) Aerosols in science, medicine, and technology. Aerosols in and from industrial processes.** Stoeber, S.; Lindner, W. (Gesellschaft fuer Aerosolforschung e.V., Bad Soden (Germany, F.R.)). 1981. 319p. (In German). (CONF-8109188—Vol.2). NTIS (US Sales Only), PC A15/MF A01. Order Number DE83780503.

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Separate abstracts were prepared for papers in these proceedings.

33185 **Evaluation of fiber optics for in-line photometry in hostile environments.** Bauer, M.L. (Oak Ridge National Lab., TN); Bostick, D.T.; Strain, J.E. *Proceedings of the Society of Photo-Optical Instrumentation Engineers;* **296**: 251-253(1981). Contract W-7405-ENG-26.

Commercial fiber optic cables, both bundled and single-fiber, were evaluated for application in an in-line photometer being developed for monitoring uranium and plutonium concentrations in high radiation environments in nuclear fuel reprocessing plants. The attenuation of the optical signals due to both the radiation damage and to the couplings between lengths of optical cable was determined for specimen cables. An ultraviolet-enhanced fiber bundle demonstrated good radiation resistance to a total dose of 10^6 rad, which is the dose extimated to be received during a 1-y lifetime of the in-cell portion of the photometer. The loss in signal transmission at cable junctions was greater in the fiber-bundle cable than in a 1-mm-diam, silica, single-fiber cable: a loss of 6 dB across each junction in the fiber-bundle cable vs 3 dB in the single-fiber cable. Attenuation in the single-fiber cable after a dose of 10^6 rad was 2.5 times greater at 500 nm than that of a fiber bundle of similar length. However, the single-fiber cable was still usable at a dose greater than 10^7 rad. The photometer was designed to use a single-fiber optical cable with adequate radiation shielding. 5 figures.

0509 Transport And Storage

REFER ALSO TO CITATION(S) 33215, 34223, 34224

33186 **(DOE/NV/10282—1013) US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies.** Sherman, G. Jr.; Lopez, C.A.; Neumann, A.T. (EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group; Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA); Department of Energy, Las Vegas, NV (USA). Nevada Operations Office). 1983. Contract AC08-83NV10282. 9p. (CONF-830528—6). NTIS, PC A02/MF A01. Order Number DE83011261.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Nevada Operations' experiences with the transport and dry storage of spent nuclear reactor fuel assemblies from the Florida Power and Light generating facility at Turkey Point, Florida are described.

33187 **(DP-MS—82-60) Predicting transport requirements for radioactive-waste slurries.** Motyka, T.; Randall, C.T. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 27p. (CONF-830350—1). NTIS, PC A03/MF A01. Order Number DE83011377.

From 8. international technical conference on slurry transport; San Francisco, CA, USA (15 Mar 1983).

Portions are illegible in microfiche products.

A method for predicting the transport requirements of radioactive waste slurries was developed. This method involved preparing nonradioactive sludge slurries chemically similar to the actual high-level waste. The rheological and settling characteristics of these synthetic waste slurries were measured and found to compare favorably with data on actual defense waste slurries. Pressure drop versus flow rate data obtained fom a 2-in. slurry test loop confirmed the Bingham plastic behavior of the slurry observed during viscometry measurements. The pipeline tests, however, yielded friction factors 30 percent lower than those predicted from viscometry data. Differences between the sets of data were attributed to inherent problems in interpreting accurate yield-stress values of slurry suspensions with Couette-type viscometers. Equivalent lengths of fittings were also determined and found to be less than that of water at a specified flow rate.

0510 Marketing And Economics

33188 **(PNL—4465) RECON: a computer program for analyzing repository economics. Documentation and user's manual.** Clark, L.L.; Cole, B.M.; McNair, G.W.; Schutz, M.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 245p. NTIS, PC A11/MF A01. Order Number DE83011776.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

From 1981 through 1983 the Pacific Northwest Laboratory has been developing a computer model named RECON to calculate repository costs from parametric data input. The objective of the program has been to develop the capability to evalute the effect on costs of changes in repository design parameters and operating scenario assumptions. This report documents the development of the model through March of 1983. Included in the report are: (1) descriptions of model development and the underlying equations, assumptions and definitions; (2) descriptions of data input either using card images or an interactive data input program; and (3) detailed listings of the program and definitions of program variables. Cost estimates generated using the model have been verified against independent estimates and good agreement has been obtained.

0520 Waste Management

REFER ALSO TO CITATION(S) 33066, 33183, 33187, 33188, 33240, 33242, 33244, 33245, 33246, 33248, 33249, 33250, 33252, 33253, 33254, 33255, 33967, 34042, 34043, 34046, 34364, 34400, 34426, 34449, 34462, 34463, 34467, 34472, 34669, 34670, 34671, 34672, 34673, 34676

33189 (ANL—82-58) Fuel cycle programs. Quarterly progress report, April-June 1982 . Steindler, M.J.; Bates, J.K.; Cannon, T.F. (Argonne National Lab., IL (USA)). Dec 1982. Contract W-31-109-ENG-38. 143p. NTIS, PC A07/MF A01. Order Number DE83011014.

Logging techniques are being developed to measure the relative amount of residual oil in a depleted oil reservoir by injecting gamma-active solution into it. Laboratory analog experiments are being done to examine the extent to which radioactivity might move from a nuclear waste repository because of flowing groundwater. The composition and transport of saline pore fluids in granite cores from northern Illinois and from the Canadian Shield were studied. Testing and development of equipment for the destructive analysis of full-length irradiated fuel rods from the Light Water Breeder Reactor is in progress. Work has been done on: (1) the full-scale shear, (2) the dual dissolver system, (3) scrap and waste disposal, (4) the data management system, and (5) analytical systems. Contributions to an information base that will be used in an analysis of the status of the disposal of airborne wastes from the nuclear fuel cycle include (1) development of packaging for deep geologic disposal, (2) review of practices in the packaging of LLW, (3) review of ocean disposal of LLW and HLW, (4) comparison of regulations and criteria from several sources for deep geologic disposal, (5) shallow-land burial and its regulation, and (6) regulations on packaging for transportation of radioactive materials. Simulated-flow and true-flow leach tests were compared to develop an understanding of their differing characteristics, with emphasis on leach rates and concentrations of leached species in the effluent leachates. Two leach rate models were analyzed: (1) constant leach rate independent of concentrations of leached species in the leachates and (2) variable leach rate dependent on such concentrations.

33190 (ANL—82-78) Fuel cycle programs. Quarterly progress report, July-September 1982. Steindler, M.J.; Bates, J.K.; Cannon, T.F. (Argonne National Lab., IL (USA)). Mar 1983. Contract W-31-109-ENG-38. 165p. NTIS, PC A08/MF A01. Order Number DE83011920.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The effect of slight differences in composition on the leachability of simulated nuclear waste (SRL 131 glass specimens) is being studied. In other work, contacting of simulated nuclear waste glass with a humid atmosphere has been found to be a method of accelerating aging reactions while simulating conditions that may exist in a nuclear waste repository. Nuclear logging methods are being considered for determining the oil content of depleted wells. Results indicated the desirability of measuring the integrated spectrum from a radioisotope in an injected solution. The behavior of radionuclides leached from proposed nuclear waste repositories is being studied in laboratory analog experiments, namely, flow-through experiments to examine the migration of radionuclides through backfill, the waste form, and basalt rock. The compositions of pore fluids in granites of the Canadian Shield are being determined to examine the origin and genesis of groundwater. Also being studied is the effect of dissolved organic matter (such as humic acid) in groundwater on the migration behavior of radionuclides. Testing and development of equipment for the destructive analysis of full-length irradiated fuel rods from the Light Water Breeder Reactor are in progress. An information base is being assembled that will be used in future analysis of the status of airborne waste disposal. The four radionuclides being studied are ^{85}Kr, ^{129}I, ^{3}H, and ^{14}C. The anticipated hydrologic, thermal, and hydrothermal conditions in high-level nuclear waste repositories and the resulting physical requirements for backfill materials are presented. A detailed analysis is presented on whether proposed mixtures of bentonite and crushed basalt will have adequately low permeability in the severe thermal, hydrothermal, and radiation environment expected in a repository.

33191 (ANL—83-21) Development of on-line monitoring device to detect the presence/absence of sodium vapor. Wolson, R.D.; McPheeters, C.C.; Kremesec, V.J.; Kolba, V.M. (Argonne National Lab., IL (USA)). Mar 1983. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01. Order Number DE83011925.

A process is being developed by the Sodium Waste Technology Program at ANL-W to remove metallic sodium from scrap and waste. The final step in the process is the removal of residual metallic sodium by evaporation at temperatures up to 482°C (900°F) and at pressures of about 10^{-2} torr (1.3 Pa). Efficient operation of this process requires that the operators have a method to indicate the completion of the evaporation. This end point would signify when the chamber and scrap and waste is free of metallic sodium. It was determined that a measure of the vacuum was not sufficiently sensitive, and a research effort was undertaken to select an on-line monitoring device. In this effort, three promising methods were reviewed. The use of quadrupole mass spectrometer was recommended and an on-line device was designed for use in a Sodium Process Demonstration (SPD) Plant.

33192 (CONF-820418—, pp 379-388) **Hazardous waste management alternatives utilized at the PGDP.** Getz, P.A. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

The PGDP generates a diversity of hazardous waste material. Due to this diversity and limited storage capabilities, various modes of treatment, reclamation, and disposal of these materials, both on-site and off-site, have been utilized. Plant policies and procedures have been developed for the handling of these materials to help ensure compliance with federal, state, and DOE guidelines. As a result, several potential problem areas have been identified and resolved. This report reviews these waste management alternatives with the associated problems which have been encountered to date.

33193 (CONF-820418—, pp 389-394) **Solid waste disposal system.** Kenna, W.B. (Oak Ridge Y-12 Plant, TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

This paper discusses progress to date in the Oak Ridge Y-12 Plant solid waste management program. The study on where waste is generated and the frequency of disposal will be presented. Utilization of a nondestructive gamma-ray analysis technique for measurement of the uranium in waste containers will be reviewed. Using current Nuclear Regulatory Commission (NRC) regulations and internal criteria as guidance, a scheme is presented for handling the solid waste disposal problem at the Plant.

33194 (CONF-820418—, pp 436-452) **New hydrofracture facility at ORNL.** Weeren, H.O. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Hydrofracture, or shale fracturing, is the method currently being used at Oak Ridge National Laboratory (ORNL) for the permanent disposal of locally generated radioactive waste solutions. In this process, the waste solution is mixed with a solids blend of cement and other additives; the resulting grout is then injected into an impermeable shale formation at a depth of 200 to 300 m (700 to 1000 ft). The grout sets a few hours after completion of the injection, fixing the radioactive waste in the shale formation. Since 1966, ORNL has disposed of more than 8 million L (2 million gal) of waste grout, containing over 600,000 Ci of radionuclides, via hydrofracture. A description of the process and its operational history are given. Disposal costs of the order of 25 cents/L($1/gal) are reported. A new facility has been built and will become operational by the summer of 1982.

33195 (CONF-820418—, pp 531-543) **Computerized methodology for evaluating the long-range radiological impact of shallow-land burial.** Fields, D.E.; Little, C.A.; Emerson, C.J. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

A computerized methodology has been implemented to calculate the risk to local and intermediate-range (up to 80 km distant) populations resulting wastes buried in shallow trenches such as those used at Oak Ridge. Our computer code, PRESTO (Prediction of Radiation Effects from Shallow Trench Operations), was developed under United States Environmental Protection Agency funding to evaluate possible health effects resulting from shallow burial operations. Sources of contamination include radionuclide releases from the trenches and from areas contaminated with operational spillage. The model is intended to predict radionuclide transport and the ensuing exposure and health impact to at-risk populations for a 1000-year period following cessation of burial ground operations.

33196 (CONF-830451—4) **Characterization of hydrofracture grouts for radionuclide migration.** Stinton, D.P.; McDaniel, E.W.; Weeren, H.O. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 18p. NTIS, PC A02/MF A01. Order Number DE83011398.

From American Ceramic Society annual meeting; Chicago, IL, USA (25 Apr 1983).

Detailed characterization of hydrofracture grouts was performed by optical microscopy, scanning electron microscopy, x-ray diffraction, and β-γ autoradiography. Laboratory-produced samples containing simulated wastes as well as actual radioactive samples of hydrofracture grout sheets obtained by core drilling were examined in this work. X-ray diffraction results revealed that both laboratory-produced samples and a core-drilled sample consisted primarily of calcium carbonate phases. Both sample types contained very small amounts of strontium or cesium wastes, neither of which could be detected by microscopic techniques. The core-drilled sample contained radioactive ^{90}Sr, ^{137}Cs, and ^{60}Co that could be detected by β-γ autoradiography. The autoradiograph revealed that these radionuclides were still present in the 20-year-old grout and that they had not migrated into the trapped shale fragments.

33197 (DOE/ID/01570—T59) **Low-level waste management: a report on the states - the laws, the legislature, the administration.** (Inter/Face Associates, Inc., Middletown, CT (USA)). Oct 1981. Contract AC07-76ID01570. 201p. NTIS, PC A10/MF A01. Order Number DE83011953.

This document presents a state-by-state review of existing legislation on low-level radioactive waste disposal. As noted in the introduction, exploration of regional waste management has begun in many parts of the country. To aid readers wishing to obtain legislative information quickly, this document has been organized according to those general geographical areas currently engaged in regional discussion. The first section includes those states who have yet to enter into formal compact negotiations or who have indicated their intention to manage waste as a single state. At this writing only three states have enacted a regional compact. It should also be noted that the membership of the Midwest and Southcentral areas particularly are in considerable flux. The grouping of state profiles in this document is thus for the purpose of quick reference to the changing national picture and is not presented as recommended regions.

33198 (DOE/ID/12223—T2) **Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982.** (Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort (USA)). Dec 1982. Contract FG07-81ID12223. 23p. NTIS, PC A02/MF A01. Order Number DE83009754.

Portions are illegible in microfiche products.

Primary emphasis of this project is on demonstrating the methods of design and field construction of a multilayered trench cover using available technology, and to monitor its long-term effectiveness in preventing infiltration of rainwater into radioactive waste disposal trenches. Project activities during this period included continuation of proof of installation concept tests; conclusion of the design contracting activity; continuation of literature review; and a study on the feasibility of obtaining and use of a wiped film evaporator/solidification system.

33199 (DOE/ID/12223—T3) **Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982.** (Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort (USA)). Jan 1983. Contract FG07-81ID12223. 16p. NTIS, PC A02/MF A01. Order Number DE83009756.

Portions are illegible in microfiche products.

Primary emphasis of this project is on demonstrating the methods of design and field construction of a multilayered trench cover using available technology, and to monitor its long-term effectiveness in preventing infiltration of rainwater into radioactive waste disposal trenches. Project activities during this quarter have consisted primarily of seeking final legislative approval of the contracts between the Natural Resources and Environmental Protection Cabinet (NREPC) and Roy F. Weston, Inc. (RFWI); and between NREPC and Woodward-Clyde Consultants (W-CC). Other activities included discussions regarding a possible additional task to the grant and literature review. These activities are summarized.

33200 (DOE/SR-WM—79-3-Rev.2/83) **Strategy document: long-term technology program for defense high-level waste.** (USDOE Savannah River Operations Office, Aiken, SC). Feb 1983. 44p. NTIS, PC A03/MF A01. Order Number DE83010816.

This document describes the strategy of the Defense Waste Management Program in meeting the technology requirements for long-term management of high-level waste (HLW) at the individual DOE defense sites at the Savannah River Plant near Aiken, SC, the Hanford Plant near Richland, WA, and the Idaho Chemical Processing Plant near Idaho Falls, ID. The immediate program focus is on implementing waste processing strategy selected in compliance with the National Environmental Policy Act (NEPA) at Savannah River, while continuing development of alternative strategies at Hanford and Idaho until such time as the required documents are scheduled in compliance with NEPA.

33201 (DOE/TIC—3311-S12) **Radioactive waste processing and disposal: a bibliography.** McLaren, L.H. (ed.). (Department of Energy, Oak Ridge, TN (USA). Technical Information Center). Apr 1983. 1122p. C. Order Number DE83007280.

This compilation contains 4314 citations of foreign and domestic research reports, journal articles, patents, conference proceedings, and books entered into the DOE Energy Data Base from January 1982 through December 1967. These references, as well as references from the period January 1967 through December 1981, are available for on-line searching and retrieval using the DOE/RECON system. The citations are arranged by subject category. Within a given category the arrangement is alphanumeric by report number. Citations of unnumbered documents are arranged in reverse chronological order after the reports. Each complete bibliographic record is followed by an abstract or a listing of the subject descriptors used to describe the contents of the reference for machine storage and retrieval. In many cases phrases or clauses that augment the title are also included. Five indexes, each preceded by a brief description, are provided: Corporate, Author, Subject, Contract Number, and Report Number.

33202 (DP-MS—82-46) **Precipitation process for decontamination of water-soluble SRP radioactive waste.** Lee, L.M.; Kilpatrick, L.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1982. Contract AC09-76SR00001. 25p. (CONF-821103—89). NTIS, PC A02/MF A01. Order Number DE83011378.

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

A precipitation and adsorption process has been developed to remove cesium, strontium, and plutonium from high-level radioactive waste salt solution. Sodium tetraphenyl borate (STPB) is used to precipitate cesium, and sodium titanate slurry is used to

sorb strontium and plutonium. The precipitate/adsorbate is separated from the decontaminated salt solution by crossflow filtration. This process has the potential of being implemented in existing waste tanks and would result in significant capital savings compared to an ion-exchange process for salt decontamination. Chemical and small-scale engineering studies with actual waste are reported. The effect of many variables on the decontamination factors and filter performance is defined.

33203 **(DP-MS—82-61) Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant.** Stone, J.A.; Fenimore, J.W.; Hawkins, R.H.; Oblath, S.B.; Ryan, J.P. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 16p. (CONF-830523—6). NTIS, PC A02/MF A01. Order Number DE83011609.

From International conference on radioactive waste management; Seattle, WA, USA (16 May 1983).

Solid radioactive wastes from production of nuclear materials at the Savannah River Plant (SRP) are buried in shallow trenches on a 79-hectare plot within the SRP site. The SRP burial ground, in use since 1953, has provided containment for about 370,000 m^3 of waste containing 10^7 Ci that have been buried through 1982. Site characteristics, operating practices, and monitoring results are described. Extensive field and laboratory studies aimed at developing a fundamental understanding of the soil/waste/water system of the SRP burial ground are discussed. Leaching and migration of buried radionuclides have been monitored by assays of soil cores and by periodic sampling of numerous groundwater wells. Except for tritium, none of the radionuclides have migrated significantly from the waste. Generally, traces of alpha and nonvolatile beta/gamma emitters that have entered the groundwater can be detected only by ultra-low-level radiochemical analyses. Current research efforts include: (1) migration of individual radionuclides such as ^{60}Co, ^{90}Sr, ^{99}Tc, ^{106}Ru, ^{129}I, ^{137}Cs, ^{238}Pu, and ^{239}Pu (plus nonradioactive materials such as mercury); (2) groundwater chemistry under buried waste, to determine fundamental transport mechanisms; (3) radionuclide migration from well characteized sources emplaced in lysimeters; (4) laboratory measurements of sorption on burial ground soil. In addition to ensuring continued safe operation, the ongoing waste migration studies provide technical guidance for site operations and decommissioning.

33204 **(DP-MS—82-65) DWPF process control.** Heckendorn, F.M. II. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 17p. (CONF-830205—26). NTIS, PC A02/MF A01. Order Number DE83011381.

From Waste management conference; Tucson, AZ, USA (27 Feb 1983).

Portions are illegible in microfiche products.

The Defense Waste Processing Facility (DWPF) for waste vitrification at the Savannah River Plant (SRP) is in the final design stage. Instrumentation to provide the parameter sensing required to assure the quality of the 2-ft-diam, 10-ft-high waste canister is in the final stage of development. All steps of the process and instrumentation are now operating as nearly full-scale prototypes at SRP. Quality will be maintained by assuring that only the intended material enters the canisters, and by sensing the resultant condition of the filled canisters. Primary emphasis will be on instrumentation of the process.

33205 **(DP-MS—82-73) Precipitation process for decontaminating water-soluble SRP radioactive waste.** Lee, L.M.; Kilpatrick, L.L.; Wright, W.V. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 15p. (CONF-830633—1-Summ.). NTIS, PC A02/MF A01. Order Number DE83011446.

From 3. symposium on separation science and technology for energy applications; Gatlinburg, TN, USA (27 Jun 1983).

A precipitation and adsorption process has been developed for the removal of cesium, strontium, and plutonium from high-level radioactive waste salt solution. Sodium tetraphenylborate (NaTPB) is used to precipitate cesium as the very insoluble cesium tetraphenylborate, and sodium titanate slurry is used to adsorb strontium and plutonium. The precipitate/adsorbate is then separated from the decontaminated salt solution by crossflow filtration. Chemical and small-scale engineering studies with actual waste are reported in which the effect of several variables on the decontamination factors and filter performance are defined. Implementation of this process using existing waste tanks avoids the building of a heavily shielded canyon building for salt processing with considerable savings in capital investment.

33206 **(DP-MS—82-81) Alternatives for defense waste-salt disposal.** Benjamin, R.W.; McDonell, W.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 31p. (CONF-830205—28). NTIS, PC A03/MF A01. Order Number DE83011608.

From Waste management conference; Tucson, AZ, USA (27 Feb 1983).

Alternatives for disposal of decontaminated high-level waste salt at Savannah River were reviewed to estimate costs and potential environmental impact for several processes. In this review, the reference process utilizing intermediate-depth burial of salt-concrete (saltcrete) monoliths was compared with alternatives including land application of the decontaminated salt as fertilizer for SRP pine stands, ocean disposal with and without containment, and terminal storage as saltcake in existing SRP waste tanks. Discounted total costs for the reference process and its modifications were in the same range as those for most of the alternative processes; uncontained ocean disposal with truck transport to Savannah River barges and storage as saltcake in SRP tanks had lower costs, but presented other difficulties. Environmental impacts could generally be maintained within acceptable limits for all processes except retention of saltcake in waste tanks, which could result in chemical contamination of surrounding areas on tank collapse. Land application would require additional salt decontamination to meet radioactive waste disposal standards, and ocean disposal without containment is not permitted in existing US practice. The reference process was judged to be the only salt disposal option studied which would meet all current requirements at an acceptable cost.

33207 **(DP-MS—82-94) Evaluation of glass-contact materials for waste glass melters.** Rankin, W.N. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 15p. (CONF-830451—2). NTIS, PC A02/MF A01. Order Number DE83011452.

From American Ceramic Society annual meeting; Chicago, IL, USA (25 Apr 1983).

Alternative refractory and electrode materials have been evaluated as glass-contact materials for the vitrification of SRP waste. Monofrax K-3 (The Carborundum Co.) is the optimum refractory, based on corrosion and thermal-shock resistance. Inconel 690 (Huntington Alloys, Inc.) is the recommended electrode alloy. However, a potentially more corrosion-resistant alternative, UCAR Metal Ceramic, Grade LT-1 (Union Carbide Corp.), is being evaluated further. This material melts at a much higher temperature than Inconel 690. In the event of an unexpected high-temperature excursion in a melter, this material may offer significantly greater protection.

33208 **(DP-MS—82-96) Physical modeling of a glass melter designed for vitrification of defense waste.** Routt, K.R. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 29p. (CONF-830451—3). NTIS, PC A03/MF A01. Order Number DE83011445.

From American Ceramic Society annual meeting; Chicago, IL, USA (25 Apr 1983).

Portions are illegible in microfiche products.

Physical modeling principles applied to the simulation of a glass melter designed for processing of radioactive waste glass appear to be excellent tools for evaluating melter design and performance. Models can certainly provide information in greater detail regarding temperature and voltage profiles than is usually obtainable in an actual glass melter. Furthermore, the measurement of velocity profiles in an actual melter is not possible but can be easily performed in a model. A model can not only be used to increase general understanding of the melting process, but it can also pro-

vide specific suggestions for improvement in melter design. As a result of the modeling results presented here, for example, it was recommended that the bottom heat transfer coefficient U/sub b/ be decreased in future melter designs in order to raise the temperature of the glass near the bottom of the melt pool. It was also recommended that alternate electrode configurations be examined in order to provide flexibility in control of the electrical power density in the vertical direction. Future work with physical models will study these recommendations in detail.

33209 **(DP-MS—83-18) Prevention of stress corrosion cracking in nuclear waste storage tanks.** Ondrejcin, R.S. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 32p. (CONF-830467—1). NTIS, PC A03/MF A01. Order Number DE83012006.

From Multivariable regression symposium; Nashville, TN, USA (27 Apr 1983).

Portions are illegible in microfiche products.

At the Savannah River Plant, stress corrosion of carbon steel storage tanks containing alkaline nitrate radioactive waste is prevented by stress relief and specification of limits on waste composition and temperature. Actual cases of cracking have occurred in the primary steel shell of tanks designed and built before 1960 and were attributed to a combination of high residual stresses from fabrication welding and aggressiveness of fresh wastes from the reactor fuel reprocessing plants. The fresh wastes have the highest concentration of nitrate, which has been shown to be the cracking agent. Also, as the waste solutions age and are reduced in volume by evaporation of water, nitrite and hydroxide ions become more concentrated and inhibit stress corrosion. Thus, by providing a heel of aged evaporated waste in tanks that receive fresh wastes, concentrations of the inhibitor ions are maintained within specific ranges to protect against nitrate cracking. The concentration and temperature range limits to prevent cracking were determined by a series of statistically designed experiments.

33210 **(DPSP—79-17-12) Tank 16 demonstration: single-pump test results.** West, W.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 26 Apr 1979. Contract AC09-76SR00001. 22p. NTIS, PC A02/MF A01. Order Number DE83012200.

Portions are illegible in microfiche products.

The one-pump test successfully demonstrated the low velocity hydraulic cleaning concept in a waste tank with actual sludge. The pumps, controls, instruments and other facilities operated reliably. The slurry pump's 30-ft cleaning radius, compared to the 20-ft radius indicated by TNX testing, will have a significant effect on the waste removal project since fewer pumps will be required. Tank 16 sludge was slurried and transferred using long-shaft centrifugal pumps. The first test used only 17,000 total gallons of seal and probing water as slurrying medium. After slurrying 86 hr, 22,000 gallons of 37% solids slurry was transferred. This removed 15% of the original sludge in tank 16 to a definite benchline at a 20-ft radius from the slurry pump. The second slurrying of 208 hr used 29,000 gallons supernate from tank 21 plus 13,000 gallons seal water. Fifty-six thousand gallons of slurry at 20% solids was transferred (a cumulative 36% of the original sludge). The cleaning radius was extended to 30 ft.

33211 **(DPSP—79-17-17) Tank 16 demonstration: multi-pump test results.** Comly, C. IV. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 29 Jun 1979. Contract AC09-76SR00001. 20p. NTIS, PC A02/MF A01. Order Number DE83012202.

Portions are illegible in microfiche products.

Long-shaft pumps were installed in risers 2, 4A, and 8 of tank 16 to determine the minimum number of pumps required to slurry all the sludge in a waste tank. Figure 2 shows the equipment arrangement. Operation of two pumps (in risers 2 and 8) did not slurry all the sludge. Operation of three pumps (in risers 2, 4A, and 8) slurried material throughout the tank, but a 450 square foot pile of sludge was left under riser 3. Additional slurrying, with pump discharges directed at this pile, removed all but several small scattered piles. About 1.8% of the original 77,000 gallons of sludge remained after multipump testing. These results indicate only three or four pumps of the type used will be required per tank (depending on tank type) for hydraulic cleaning versus the seven to nine pumps per tank predicted in earlier studies. Because fewer pumps are required, no risers will have to be cut in the tank tops. Operating problems with the pumps were minimal. No excessive tank top deflection was detected. Based on reliable performance during the demonstration, the tank 16 long-shaft pump design is considered a satisfactory candidate for use in the waste removal program. Some improvements in the design are desirable to reduce seal water leakage and to facilitate decontamination. Operating data for tank 16 and associated facilities during the tests are included in this report.

33212 **(DPST—70-512) Removal of sludge from waste tanks.** (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 30 Oct 1970. Contract AC09-76SR00001. 5p. NTIS, PC A02/MF A01. Order Number DE83012201.

Recent attempts by the Plant to transfer sludge from waste tanks preparatory to salt storage have given unsatisfactory results. This has raised the question as to whether more development work is needed on sludge removal techniques. We believe that the present techniques for sludge removal are adequate for moving waste to bedrock when the tanks are to be abandoned, and that further development work is not needed for this purpose. The removal of sludge for purposes of salt cake storage was never the object of the SRL studies. We believe that further development work would not significantly improve the capabilities of the technique for use in current waste management. To clear up misunderstanding that may have arisen, this letter summarizes the Laboratory development of sludge removal, the objectives of the program, and a review of sludge removals to date.

33213 **(DPST—81-914) Hazards analysis of TNX Large Melter-Off-Gas System.** Randall, C.T. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Mar 1982. Contract AC09-76SR00001. 66p. NTIS, PC A04/MF A01. Order Number DE83012206.

Portions are illegible in microfiche products.

Analysis of the potential safety hazards and an evaluation of the engineered safety features and administrative controls indicate that the LMOG System can be operated without undue hazard to employees or the public, or damage to equipment. The safety features provided in the facility design coupled with the planned procedural and administrative controls make the occurrence of serious accidents very improbable. A set of recommendations evolved during this analysis that was judged potentially capable of further reducing the probability of personnel injury or further mitigating the consequences of potential accidents. These recommendations concerned areas such as formic acid vapor hazards, hazard of feeding water to the melter at an uncontrolled rate, prevention of uncontrolled glass pours due to melter pressure excursions and additional interlocks. These specific suggestions were reviewed with operational and technical personnel and are being incorporated into the process. The safeguards provided by these recommendations are discussed in this report.

33214 **(DPSTD—82-65-Rev.1) Decontaminated salt disposal as saltcrete in a landfill. Technical data summary.** (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 6 Aug 1982. Contract AC09-76SR00001. 34p. NTIS, PC A03/MF A01. Order Number DE83012204.

Portions are illegible in microfiche products.

This technical data summary presents a reference process for immobilizing decontaminated salt solution from the 200-Area waste storage tanks with cement, and disposing of the final waste material (called saltcrete) by burial in trenches. The saltcrete will be protected from leaching by clay and will be placed at least 3 meters above the historic high water table and beneath at least 5 meters of soil overburden. The decontaminated salt solution is a waste material which remains after the bulk of the radionuclides have been removed from waste tank supernate. This removal is effected by contacting the waste supernate with sodium tetraphenyl boron (NaTPB) and sodium titanate ($NaTi_3O_5H$). These materials remove (by precipitation) most of the ^{137}Cs and ^{90}Sr as well as many other radioactive and non-radioactive elements. These precipitates, along with many other sludges which reside in the HLW tanks will be incorporated in borosilicate glass for eventual disposal in a geologic

repository. An ion exchange process will also be used for removal of ^{99}Tc. The decontaminated salt solution has sufficiently low levels of radioactivity that it can be disposed of on-site. The scope of the curent effort is to describe a process for blending decontaminated salt solution with cement to form a saltcrete product which has dimensional stability and relatively low leachability. The process is to be capable of solidifying 10 gpm of supernate. About 100 million gallons of salt solution is to be solidified.

33215 (INIS-mf—7475-Vol.A, pp vp) **Considerations on the management of wastes expected to be generated by the operation of Brazilian nuclear reactors.** Hamacher, M.E.; de Oliveira, L.F.S. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia). 1981. (In Portuguese). NTIS (US Sales Only), PC A19/MF A01. (CONF-8104136—Vol.A).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

Some parameters which are essential to the formulation of a correct management strategy of radioactive waste in Brazil are evaluated. Among the most significant results are: a) the annual and cumulative inventory of high level products up to the year 2000, and b) an estimate of the dates when it will be necessary to remove spent fuel from the plant sites. The results were obtained by assuming two distinct nuclear power plant introduction scenarios in Brazil.

33216 (INIS-mf—7498, pp vp) **Radioactive waste disposal options for the operation of nuclear power stations.** Boger, Z. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33217 (INIS-mf—7498, pp vp) **Leaching behavior of monazite.** Eyal, Y. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33218 (INIS-mf—7498, pp vp) **Long-term stability of alpha-recoil damage in monazite.** Eyal, Y. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33219 (INIS-mf—7498, pp vp) **Stopping of alpha-recoil atoms in silicon.** Hoffman, S.; Munzenberg, G.; Valli, K.; Hessberger, F.; Armbruster, P. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)); Thuma, B. (Giessen Univ. (Germany, F.R.). 2. Physikalisches Inst.); Eyal, Y. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33220 (INIS-mf—7501, pp vp) **New trends in development of instrumentation for ion exchange purification of radioactive liquid wastes.** Korinek, M. (Vyzkumny Ustav Chemickych Zarizeni, Brno (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

Filters were proposed for ion exchange purification with external regeneration proceeding in separate vessels and with internal regeneration taking place in the filter itself. The purification procedure is described for a mixed filter of 1000 mm in diameter with external regeneration. It consists in the filling of the filter with ion exchangers, the formation of a mixed bed, the fixation of the mixed bed, the filtration proper and the regeneration of the mixed bed. An internal regeneration mixed filter is recommended for use in the purification of water with a flow rate not exceeding 60 m/h. External regeneration is recommended for filtration flow rates above 60 m/h and when more filters are used. The external regeneration filters better use the operating time.

33221 (NUREG/CR—3235-Vol.1) **Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1.** Ortiz, N.R.; Wahi, K.K. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 21p. (SAND—82-1557-Vol.1). NTIS, PC A02/MF A01. Order Number DE83011884.

Portions are illegible in microfiche products.

The Environmental Protection Agency (EPA) has prepared a draft Standard (40CFR191, Draft 19) which, when finalized, will provide the overall system requirements for the geologic disposal of radioactive waste. This document (Vol. 1) provides an Executive Summary of the work performed at Sandia National Laboratories, Albuquerque, NM, under contract to the US Nuclear Regulatory Commission to analyze certain aspects of the draft Standard. The issues of radionuclide release limits, interpretation, uncertainty, achievability, and assessment of compliance with respect to the requirements of the draft Standard are addressed based on the detailed analyses presented in five companion volumes to this report.

33222 (NUS—3440-Rev.1) **1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds.** Guilbeault, B.D. (NUS Corp., San Francisco, CA (USA)). Nov 1980. Contract AC07-76ID01570. 109p. NTIS, PC A06/MF A01. Order Number DE83011954.

Portions are illegible in microfiche products.

This report provides, on a state-by-state basis, estimates of the quantities and characteristics of low-level radioactive wastes (LLW) generated in 1979 in the following sectors: commercial nuclear power plants, medical and educational institutions, industry (other than commercial nuclear power plants), and government and military. An estimated 79,914 cm^3 of radioactive waste, containing 477,437 Ci of radioactivity were buried in the three US commercial burial grounds in 1979. By the best approximation available at the time of this report, the volume that could be attributed to the industrial category is 17,881 cm^3 and the volume that could be attributed to the institutional category is 14,954 cm^3. No curie breakdown is possible from available sources of information.

33223 (ONWI—419) **Workshop on uncertainty analysis of postclosure nuclear waste isolation system performance.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 110p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83011664.

A Workshop on Uncertainty Analysis of Post-Closure Nuclear Waste Isolation System Performance was held on October 2-3, 1980 in Galveston, Texas. The Workshop was organized by INTERA Environmental Consultants, Inc., under contract to the Office of Nuclear Waste Isolation. About seventy-five persons attended the workshop. Twelve participants, representing a range of disciplines, were invited to a pre-Workshop Planning Session on September 29 - October 1, 1980. During this session they prepared a survey of various aspects and approaches to uncertainty analysis for nuclear waste applications. This survey provided a focus for discussion in the Workshop itself. On October 2, presentations were made by the members of this planning group, followed by questions and discussions with the Workshop attendees. On October 3, an invited panel gave their reactions to the draft document and discussions of the previous day. There was also audience interaction with these panelists. This document presents a summary, but not a concensus, of the various views expressed by the participants in the pre-workshop planning session and in the workshop sessions. The document does not necessarily represent the opinions of INTERA or ONWI. The information presented in this document has formed part of the basis for defining the approach to uncertainty analysis under the SCEPTER project.

33224 (ONWI—436) **FFSM: Far-Field State Model. Technical report.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 237p. NTIS (US Sales Only), PC E10/MF $5.50. Order Number DE83011518.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Includes 8 sheets of 24x reduction microfiche.

Documentation is given for the Far-Field State Model (FFSM), a computerized model for predicting the approximate geologic and climatic state of a site for a nuclear waste repository over relatively long periods of time in the future. The model considers both natural events and processes as well as human actions. It is based on a simulation methodology previously used in the Geologic Simulation Model developed by Battelle Pacific Northwest Laboratory for evaluating a site in the Pasco Basin under the AEGIS Program. The methodology has been applied within the FFSM in these dimensions, considering a broad set of natural and human phenomena that enable application to a wide range of potential sites. The FFSM provides direct information about the long-term evolution of the site, and it provides input data for other codes, including both ground-water flow and nuclide transport codes and dose codes. The geologic environments that can be treated within FFSM are varied and include all types of sites currently being evaluated for repositories. The phenomena included in the code are: undetected features, climate, worldwide glaciation, local glaciation, folding, salt diapirism, volcanism, faulting, biosphere state, regional deformation, geomorphic processes, dissolution fronts, localized dissolution (breccia pipes), solution mining, and drilling. The code can be used in both a deterministic mode (to evaluate interactions or to calculate point values) and a probabilistic mode (to make statistical estimates of future changes). In the probabilistic mode, the technique of Monte Carlo simulation is used to generate output probabilities, based on user-supplied input data that is largely in the form of probability density functions for variable or uncertain parameters.

33225 (ORNL—5999, pp 64-84) **Low-level waste research and development program.** Cutshall, N.H. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

That Low-Level Waste Research and Development Program integrates work directed toward waste-management activities at ORNL with generic LLW studies and demonstration projects conducted for the DOE LLWMP. Site-specific ORNL work involves solid-waste disposal area studies of three ORNL burial grounds; vegetation management studies for burial grounds; monitoring and corrective measures analyses for inactive, intermediate-level liquid radioactive waste sites; and waste-management-related studies of local and regional geology. Generic tasks are focused on improving SLB methods and instituting corrective measures for older sites; primary emphasis is on disposal in environments with > 750 mm of annual precipitation.

33226 (ORNL—5999, pp 85-88) **Department of Energy Low-Level Waste Management Program.** Mezga, L.J. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The overall objective of the LLWMP is to develop and promote environmentally sound techniques for safely and efficiently managing the disposal of all types of low-level wastes (LLW). Such activities as energy production, manufacturing, and the use of radioisotopes in medical and research activities produce LLW. Specific program technology objectives include the development of waste treatment and packaging technology; development of improved shallow-land burial (SLB) technology; establishment of corrective measures for stabilizing and improving performance of existing burial grounds; identification and evaluation of alternative methods for storage and disposal of LLW that provide greater confinement than SLB; and development of guidelines or standards for waste characterization, disposal, and monitoring.

33227 (ORNL—5999, pp 89) **Waste isolation program.** Stow, S.H. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The Waste Isolation Program, which is funded through the Office of Nuclear Waste Isolation (ONWI) at Battelle-Columbus represents a diverse effort heavily oriented toward basic research at ORNL. Activities span seven ORNL divisions and range from studies of the geochemistry of salt recrystallization to socioeconomic analysis for waste siting. The program is managed through ESD. In the ESD, the major emphasis has been on regional environmental characterization of the southern Appalachians for possible repository siting. Regional characterizations are useful in site selection when a large geographic area is to be analyzed and uniform, objective criteria are to be applied. Relevant information summarized at a level of resolution appropriate for the size of the region was processed using predetermined screening criteria. Environmental and socioeconomic criteria, in conjunction with geologic criteria, were used as inputs for selection of a site. Environmental and socioeconomic data that were analyzed include demography, mineral resources, water availability and quality, land use, the nature of terrestrial and aquatic systems, and climate.

33228 (ORNL/TM—8539) **In-situ grouting of uranium-mill-tailings piles: an assessment.** Tamura, T.; Boegly, W.J. Jr. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 91p. NTIS, PC A05/MF A01. Order Number DE83012302.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Passage in 1978 of the Uranium Mill Tailings Radiation Control Act (UMTRCA) initiated a program of remedial action for 22 existing mill tailings piles generated in the period 1940 to 1970 as part of the nation's defense and nuclear power programs. The presence of these piles poses potential health and environmental contamination concerns. Possible remedial actions proposed include multilayer covers over the piles to reduce water infiltration, reduce radon gas releases, and reduce airborne transport of tailings fines. In addition, suggested remedial actions include (1) the use of liners to prevent groundwater contamination by leachates from the piles and (2) chemical stabilization of the tailings to retain the radioactive and nonradioactive sources of contamination. Lining of the piles would normally be applicable only to piles that are to be moved from their present location such that the liner could be placed between the tailings and the groundwater. However, by using civil engineering techniques developed for grouting rocks and soils for strength and water control, it may be possible to produce an in situ liner for piles that are not to be relocated. The Department of Energy (DOE) Uranium Mill Tailings Remedial Action Project Office requested that ORNL assess the potential application of grouting as a remedial action. This report examines the types of grouts, the equipment available, and the costs, and assesses the possibility of applying grouting technology as a remedial action alternative for uranium mill tailings piles.

33229 (PB—83-162917) **Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations.** van den Broek, W.M.G.T. (Technische Hogeschool Delft (Netherlands)). Jan 1978. 18p. NTIS, PC A02/MF A01.

The suggested constants for the purpose of temperature calculations are: the specific mass, the specific heat and the coefficient of heat conductivity of rock salt as functions of temperature, and the heat produced by nuclear fission waste. The authors point to the fact that specific mass, specific heat and the coefficient for heat conductivity are all affected by an increase in compression, but the effect is so low that it was ignored in the study. The nuclear waste is the product remaining following the reprocessing of exhausted reactor rods. The rods are packed into rustfree steel cylinders and then stored in rock salt. The heat produced by nuclear waste is dependent on a time element. Only waste from light water reactors was studied.

33230 **(PB—83-162925) Underground storage of radioactive waste in rock salt: organization of the work concerning the underground storage of radioactive waste.** Dietz, D.N. (Technische Hogeschool Delft (Netherlands)). Feb 1979. 11p. NTIS, PC A02/MF A01.

The underground storage of radioactive waste involves a variety of aspects and has been studied for some time by a variety of bodies, organizations and individuals. This has produced a large number of data, but because of lack of cooperation, no reliable basic set of data has been developed. This points to the need for a monolithic organization to develop plans for underground storage, irrespective of whether any particular plan is accepted or rejected at the political level. This 'Authority' would be responsible for the development and possibly the execution of such plans. To this effect, the Authority would have to have a vast core of expert personnel at its disposal. A law would have to be enacted to force private companies to put geological data and their interpretation at the disposal of the Authority on a confidential basis. Test drilling would have to be the responsibility of the Authority alone. The collection of storage techniques opens up innumerable possibilities for the storage of radioactive waste in other salt formations besides the salt domes. In order to safeguard its independent position, oversight bodies would not be allowed to participate directly in the activities of the Authority.

33231 **(PB—83-162933) Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt.** van den Broek, W.M.G.T. (Technische Hogeschool Delft (Netherlands)). Mar 1979. 142p. NTIS, PC A07/MF A01.

In storing nuclear fission waste, the mechanical behavior of the surrounding salt depends on temperature increases due to the heat emission of the waste product. These temperature increases will depend on the storage pattern: diameter and length of storage columns, their mutual distance, the number of columns, the sequence of storage. In the past, a number of calculations has been carried out to predict this temperature reaction. Usually, these calculations were based on a storage pattern in vertical columns, with an infinite horizontal field, with all columns being introduced at the same time. Sometimes the changes in the temperature of the physical elements of rock salt were taken into account. Here, the limitations and flexibilities were chosen differently. The physical elements were kept constant, which made the results applicable to any chosen depth. The choice of storage pattern was not limited, nor did it have to be infinite. The latter is particularly important: in an extreme case, one could limit oneself to three shafts for the full 40 year period of the 3500 megawatt plan. Nor was it necessary here to assume that all waste was being stored at the same time. Both systems of calculations can be developed in such a way that the resulting temperature hikes are to large, so that a safety margin is obtained. Both systems can be complementary and certain cases could be calculated by both systems, which would make mutual control possible.

33232 **(PNL-SA—10934) Remote design features for the West Valley slurry-fed ceramic melter system.** Siemens, D.H.; Chapman, C.C. (Pacific Northwest Lab., Richland, WA (USA)). Feb 1983. Contract AC06-76RL01830. 10p. (CONF-830451—5). NTIS, PC A02/MF A01. Order Number DE83011950.

From American Ceramic Society annual meeting; Chicago, IL, USA (25 Apr 1983).

This paper discusses features that have been identified as needing additional development to make the melter system remotely operable for use at West Valley, and the planned approach for developing the identified items. Each of the following features are discussed: melter electrode power supply; in-melter viewing; thermocouple connectors; overflow section heaters; nozzle cleaning; replaceable inserts in the melter overflow section; canister installation and removal; melter overflow to turntable tank connection; and detection glass level in the storage canister during filling.

33233 **(RHO-BW-ST—36P) Technical conservatism in the design and analysis of a nuclear-waste repository in basalt.** Jones, K.A. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 30 Sep 1982. Contract AC06-77RL01030. 65p. NTIS, PC A04/MF A01. Order Number DE83011928.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The US Department of Energy's National Waste Terminal Storage Program has adopted a policy of technical conservatism to guide the design and analysis of geologic disposal systems for commercial high-level radioactive waste. Technical conservatism serves as the programmatic philosophy for managing uncertainty in the performance of the disposal system. The implementation of technical conservatism as applied to a nuclear waste repository in basalt is discussed. Preliminary assessments of the performance of the waste package, repository, and site subsystems are compared to key proposed regulatory criteria. The comparison shows that there are substantial safety margins in the predicted performance of the nuclear waste repository in basalt.

33234 **(UCID—19764) Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I.** Bazan, F.; Rego, J.; Failor, R.; Coles, D. (Lawrence Livermore National Lab., CA (USA)). 31 Mar 1983. Contract W-7405-ENG-48. 197p. NTIS, PC A09/MF A01. Order Number DE83012449.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A 440-day single-pass continuous-flow leaching experiment was conducted at LLNL from September 1980 to December 1981. The data obtained for only one-third of the experiment are presented. The laboratory and data analysis of the remaining portion is still in progress at this time and a second report will follow at the end of FY83. This report concerns itself with the study of PNL 76-68 glass beads interacting with crushed uranium flow basalt and a simulated basalt groundwater under controlled conditions of temperature (25°C and 75°C) and flow rate (1, 10, and 300 ml/day). The main purpose of the experiment was to determine the absorption on basalt of Pu, Np, and some of the stable elements such as B, Mo, U, and Cs, as they were leached from the glass beads. Results are presented, as incremental and cumulative leach rates and sorption rates have been calculated for Pu, Np, B, Mo and U. also sorption profiles as a function of temperature and flow rate are graphically shown for Pu, Np, and U.

33235 **Management of high-level waste repository siting.** Hill, D.; Pierce, B.L.; Metz, W.C.; Rowe, M.D.; Haefele, E.T.; Bryant, F.C.; Tuthill, E.J. (Brookhaven National Lab., Upton, NY). *Science (Washington, D.C.);* **218**: 859-864(26 Nov 1982).

The selection of sites to store high-level radioactive waste will require more than technical decisions; an acceptable site must gain widespread public support. Ad hoc approaches have recently served as a stimulus to overcome institutional inertia in radioactive waste management, as exemplified by the Interagency Review Group and the State Planning council for Radioactive Waste Management, but ad hoc approaches have not characteristically succeeded in resolving intense conflicts. Acceptable sites can best be established through traditional processes of legal and scientific advocacy, and their ultimate legitmacy will depend on the proper use of established democratic processes. 1 figure.

33236 **Ocean disposal of radioactive wastes.** Templeton, W.L. (Pacific Northwest Lab., Richland, WA); Preston, A. *Radioactive Waste Management (Oak Ridge, Tennessee);* **3**: No. 1, 75-113(Sep 1982). Contract AC06-76RL01830.

The purpose of this paper was to describe the major sources of radiation in the marine environment, to present the relevant standards for radiation exposure, and to discuss the rationale and application of methodologies for controlling both liquid and solid radioactive waste disposals to the ocean. (BLM)

33237 **Management of plutonium contaminated waste.** Grover, J.R. (ed.). New York, NY; Harwood Academic Publishers (1982). 196p. Harwood Academic Publishers, P.O. Vox 786, Cooper Station, New York, NY 10276 $30.00.

From publisher's announcement.

This study surveys the current management schemes for plutonium contaminated wastes arising from a reference mixed oxide fuel fabrication plant, and identifies possible areas of future research. It also outlines strategies for the future management of plutonium contaminated wastes. Topics of discussion include: the quantities and characteristics of various plutonium contaminated wastes produced by a plant; the current waste management practices for both solid and liquid plutonium contaminated wastes, considering measurement methods, transportation, storage and disposal; current practice for the problems of decommissioning and decontamination, and possible methods for the recovery of plutonium contaminated wastes.

33238 **Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass.** Diamond, H.; Friedman, A.M. (Argonne National Lab., IL). *Nuclear and Chemical Waste Management;* 2: 207-212(1981).

Low-geometry x-ray spectra from ^{239}Pu and ^{237}Np, incorporated into simulated high-level radioactive waste-glass, were transformed into depth distributions for these elements. Changes in the depth profiles were observed for a series of static leachings in 75°C water. Radiochemical assay of the leach solutions revealed that little neptunium or plutonium was leached, and that the amount leached was independent of leaching time. The depth profiles of the leached specimens showed that there was selective leaching of nonradioactive components of the glass, concentrating the remaining neptunium and plutonium in a broad zone near (but not at) the glass surface. Eventual redeposition of nonradioactive material onto the glass surface inhibited further leaching. Since the depth profiles exhibit uniform concentrations of plutonium and neptunium in undisturbed simulated waste-glass, the depth of attack by the solution can be inferred by departures from the uniform concentrations. A different mechanism was observed in leaching the simulated waste-glass by room temperature 0.03 M $NaHCO_3$. There was no evidence for selective leaching or invasion of the glass by the leaching solution. There was, however, a steady buildup of plutonium (but not neptunium) upon the surface of the glass. 4 figures, 3 tables.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 33189, 33190, 33196, 33198, 33199, 33203, 33206, 33217, 33221, 33224, 33251, 33253, 33254, 33255, 34042, 34426

33239 (CONF-820418—, pp 79-89) **Fungicide treatment for cooling tower redwood.** Whinnery, W.N.; Seltzer, S.F. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

The cooling tower cells at the PGDP are sprayed annually with a pentachlorophenate fungicide to protect the redwood members from fungal attack. Betz Corporation, the previous supplier of the fungicide, has recently discontinued marketing its pentachlorophenate product. This action instigated the search for an effective, EPA-approved alternative. The EPA Position Document on pentachlorophenate states the pentachlorophenate will be classified as a restricted use pesticide with its application limited to certified applicators. Of the pentachloro-phenate fungicides available, only Chapman Chemical Company's Napchlor G is licensed by the EPA for wood spraying. Charts reviewing the treatment parameters used in comparing and evaluating the fungicides, results of comprehensive laboratory and field tests used to determine operational efficiency, and comparative cost data for annual application will be presented.

33240 **(NUREG/CR—2924) Radon diffusion in candidate soils for covering uranium mill tailings.** Silker, W.B.; Kalkwarf, D.R. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 60p. (PNL—4434). NTIS, PC A04/MF A01 - GPO $5.00. Order Number DE83012448.

Portions are illegible in microfiche products.

Diffusion coefficients were measured for radon in 34 soils that had been identified by mill personnel as candidate covers for their tailings piles in order to reduce radon emission. These coefficients referred to diffusion in the total pore space of the soils. They were measured in the laboratory by a steady-state method using soil columns compacted to greater than 80% of their Proctor maximum packing densities but with moisture contents generally less than would be expected at a tailings site. An empirical equation was used to extrapolate measured coefficients to value expected at soil-moisture contents representative of tailings sites in the western United States. Extrapolated values for silty sands and clayey sands ranged from 0.004 to 0.06 cm^3/s. Values for inorganic silts and clays ranged from 0.001 to 0.02 cm^2/s.

33241 **(ONWI—432) MMT: a random-walk one-dimensional multicomponent mass-transport code.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 174p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE83012466.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report describes the MMT (Multicomponent Mass Transport) computer code which calculates the one-dimensional transport of radionuclides by Discrete-Parcel-Random-Walk (DPRW) approach in a specified uniform ground-water flow system with constant transport and hydrologic properties. The code takes into account sorption/desorption effects, longitudinal hydrodynamic dispersion, convective transport, and radioactive decay and linear or branched decay chains with an arbitrary number of members. The document contains a user's manual for the code, verification, and sample test cases. In the Section 1.5 of this document the code custodianship and control is described along with the status of verification, validation, and peer review of this report.

33242 **(ONWI—433) GETOUT: a computer code for one-dimensional analytical solution for radionuclide transport.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 176p. NTIS (US Sales Only), PC E08/MF A01. Order Number DE83011667.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Includes 1 sheet of 24x reduction microfiche.

GETOUT code evaluates an analytical solution for convective-dispersive transport of radionuclides in groundwater. An infinitely long one-dimensional flow path for the nuclides, homogeneous retardation factors, and an interstitial velocity invariant in space and time are assumed. The code handles straight chains with a maximum of three nuclides in one chain. The code cannot evaluate the solution for certain combinations of Peclet numbers, decay numbers, and retardation factors. The output from the code consists of a time profile of nuclide discharge rate and total nuclide discharge. It can be used for site subsystem assessment in the National Waste Terminal Storage program.

33243 **(PB—83-165464) Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final).** Yamamoto, T. (Forest Service, Fort Collins, CO (USA). Rocky Mountain Forest and Range Experiment Station). Oct 1982. 27p. NTIS, PC A03/MF A01.

The following aspects of uranium mine and mill tailings management are reviewed and discussed: (1) the history of the uranium remedial action program, (2) magnitude of the uranium spoils problem, (3) uranium deposits, mining, and milling, (4) status of reclamation, (5) problems in revegetation of uranium spoils and tailings, and (6) health and safety considerations.

33244 **(RHO-HS-SA—19-P) Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site.** Last, G.V. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1983. Contract AC06-77RL01030. 11p. (CONF-830205—27). NTIS, PC A02/MF A01. Order Number DE83010930.

From Waste management conference; Tucson, AZ, USA (27 Feb 1983).

Portions are illegible in microfiche products.

Chemical reprocessing of spent nuclear fuels at the US Department of Energy (DOE) Hanford Site has generated large volumes of low-level radioactive liquid effluents. The majority of these effluents have been used strictly for cooling or other support functions and have been discharged to ditches and ponds. The 216-U-10 (U) Pond and 216-Z-19 (Z-19) Ditch are two such disposal facilities and were selected as representative examples of an integrated system of ditches, ponds, and overflow facilities collectively referred to as the U Pond disposal system. The U Pond system has been used since 1943 and has received a large variety of radioisotopes from several sources. The long-term use of U Pond and the Z-19 Ditch has resulted in the localized accumulation of transuranic and fission-product inventories due to sorption and filtration of particulates onto the uppermost sediments. The various radionuclides have different distributions due to their individual discharge sources and behaviors in this type of a disposal system. Cesium-137 is the most widely distributed radionuclide and was used as an index radionuclide to define the maximum extent of contamination. Its 400 pCi/g isopleth indicates surface contamination of approximately 19 hectares at U Pond and the 216-U-11 Overflow Basin. This contamination is localized in the top ten centimeters (cm) of soil and decreases rapidly with depth. The Z-19 Ditch and its backfilled predecessors, the 216-Z-11 (Z-11) and 216-A-11 (Z-1) Ditches, received Plutonium-238/239/240 and Americium-241 discharges from the 234-5Z and 231-Z facilities and retained more than 90% of the plutonium inventory discharged to the U Pond system. Based upon the results of this study, the U Pond system has been found to be an effective waste management facility for disposing of large volumes of low-level liquid wastes.

33245 **(SAND—83-0660) Radionuclide transport code development in support of nuclear waste storage investigations.** Martinez, M.J.; Bixler, N.E. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1983. Contract AC04-76DP00789. 59p. NTIS, PC A04/MF A01. Order Number DE83012380.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report documents the status of radionuclide transport code development in support of the Nevada Nuclear Waste Storage Investigations (NNWSI) program as of October 1982. The modifications made to an existing code, FEMWASTE, are described and subsequent verification of the modified code is presented.

0540 Health And Safety

REFER ALSO TO CITATION(S) 33213, 33221, 34424, 34466, 34603

33246 **(LA—7971-MS) Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report.** Warner, C.L. (comp.). (Los Alamos National Lab., NM (USA)). Jul 1979. Contract W-7405-ENG-36. 238p. NTIS, PC A11/MF A01. Order Number DE83011871.

Portions are illegible in microfiche products.

The Final Safety Analysis Report (FSAR) for the Transuranic-Contaminated Solid-Waste Treatment Facility has been prepared in compliance with the Department of Energy (DOE) Manual Chapter 0531, Safety of Nonreactor Nuclear Facilities. The Treatment Development Facility (TDF) at the Los Alamos Scientific Laboratory is a research and development facility dedicated to the study of radioactive-waste-management processes. This analysis addresses site assessment, facility design and construction, and the design and operating characteristics of the first study process, controlled air incineration and aqueous scrub off-gas treatment with respect to both normal and accident conditions. The credible accidents having potentially serious consequences relative to the operation of the facility and the first process have been analyzed and the consequences of each postulated credible accident are presented. Descriptions of the control systems, engineered safeguards, and administrative and operational features designed to prevent or mitigate the consequences of such accidents are presented. The essential features of the operating and emergency procedures, environmental protection and monitoring programs, as well as the health and safety, quality assurance, and employee training programs are described.

33247 **(NUREG—0941) NRC's limit on intake of uranium-ore dust.** McGuire, S.A. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Apr 1983. 24p. NTIS, PC A02/MF A01 - GPO $3.50. Order Number DE83902112.

In 1960 the Atomic Energy Commission adopted an interim limit on the intake by inhalation of airborne uranium-ore dust. This report culminates two decades of research aimed at establishing the adequacy of that limit. The report concludes that the AEC underestimated the time that thorium-230, a constituent of uranium-ore dust, would remain in the human lung. The AEC assumed that thorium-230 in ore dust would behave like uranium with a 120-day biological half-life in the lung. This report concludes that the biological half-life is actually on the order of 1 year. Correcting the AEC's underestimate would cause a reduction in the permitted airborne concentration of uranium-ore dust. However, another factor that cancels the need for that reduction was found. The uranium ore dust in uranium mills was found to occur with very large particle sizes (10-micron activity median aerodynamic diameter). The particles are so large that relatively few of them are deposited in the pulmonary region of the lung, where they would be subject to long-term retention. Instead they are trapped in the upper regions of the respiratory tract, subsequently swallowed, and then rapidly excreted from the body through the gastrointestinal tract. The two effects are of about the same magnitude but in opposing directions. Thus the present uranium-ore dust intake limit in NRC regulations should provide a level of protection consistent with that provided for other airborne radioactive materials. The report recalculates the limit on intake of uranium-ore dust using the derived air concentrations (DAC) from the International Commission on Radiological Protection's recent Publication 30.[3] The report concludes that the silica contained in uranium-ore dust is a greater hazard to workers than the radiological hazard.

33248 **(NUREG/CR—3235-Vols.5-6) Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6.** (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 144p. (SAND—82-1557-Vols.5-6). NTIS, PC A07/MF A01 - GPO $6.50. Order Number DE83012241.

Portions are illegible in microfiche products.

Simple models are presented for the estimation of individual and population health effects for long-term radionuclide releases to the surface environment. In Volume 5, models based on the use of asymptotic solutions to mixed cell models in conjunction with appropriate usage rates, dose factors, risk factors, and population estimates are demonstrated. These simple models may be useful in evaluating topics such as the potential importance of individual radionuclides, different release patterns or exposure pathways, and the relationship between individual and population exposures. Illustrative model calculations are compared with the calculated population exposures on which the Draft (No. 19) EPA Standard 40CFR191 is based. In Volume 6, simple models are employed to provide insights into the degree of conservatism in the health effects per curie value presented by the draft standard. No attempt is made to encompass all uncertainty in the input parameters use in the calculations, and some of the modeling assumptions used in this analysis are different from those of the EPA. Three sets of calculations of health effects (cancer deaths) per curie release are presented and discussed in terms of their potential implications upon the curie release limits of the EPA draft standard. Individual volumes are indexed.

33249 (NUREG/CR—3235-Vols.5-6, pp 88p, Vol. 5) **Health effects associtated with unit radonuclide releases to the environment.** Helton, J.C. (Arizona State Univ., Tempe). Apr 1983. NTIS, PC A07/MF A01 - GPO $6.50.

In Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6.

Simple models are presented for the estimation of individual and population health effects (i.e., latent cancer fatalities) for long-

term radionuclide releases to the surface environment. These models were suggested by techniques employed by the Environmental Protection Agency in the development of a proposed standard for the disposal of high-level radioactive waste. The modeling approach is based on the use of asymptotic solutions to mixed-cell models in conjunction with appropriate usage rates, dose factors, risk factors, and population estimates. Although the models are simple, it is felt that they can be used in preliminary investigations of topics in high-level waste disposal such as potential importance of individual radionuclides, relative importance of different release patterns or exposure pathways, and relationships between individual and population exposures. The use of the models is illustrated by calculating the population health effects along various exposure pathways for the radionuclides considered in the proposed Environmental Protection Agency Standard. The results of these calculations are compared with the calculated population exposures on which the proposed Environmental Protection Agency Standard is based.

33250 (NUREG/CR—3235-Vols.5-6, pp 54p, Vol. 6) **Calculation of health effects per curie release for comparison with the EPA standard.** Runkle, G.E. Apr 1983. NTIS, PC A07/MF A01 - GPO $6.50.

In Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6.

The Environmental Protection Agency (EPA) is developing a standard for geologic disposal of high-level radioactive wastes (40CFR191) based on radioactive releases (expressed in curies) that may result in 1000 health effects (i.e., latent cancer fatilities) over a 10,000 year period. Health effects calculations were used by EPA to establish the curie release limits. The Fuel Cycle Risk Analysis Division of Sandia National Laboratories was requested by the Nuclear Regulatory Commission (NRC) High-Level Waste Licensing Management Branch to perform calculations, using the methodology developed under the Risk Assessment Methodology Program, to compare with the results from the EPA analysis. The intent was to provide some insights into the degree of conservatism in the health effects per curie values presented by the EPA standard. No attempt was made to encompass all the uncertainty in the input parameters used in the calculations and some of the modeling assumptions used in this analysis are different from those of the EPA. Three sets of calculations of health effects (cancer deaths) per curie release were performed in this analysis. The calculational methods, the results of the analysis and the potential implication of these results upon the curie release limits of the EPA are discussed in this report.

33251 (ONWI—446) **PABLM: a computer code to compute accumulated radiation doses from radionuclides transported to aquatic and terrestrial pathways in the biosphere.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 208p. NTIS (US Sales Only), PC A10/MF A01. Order Number DE83012468.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The code evaluates the biosphere transport and subsequent dose-to-man of radionuclides discharged to the biosphere from a geologic repository system. Whole body exposure and ingestion doses are evaluated for radionuclides transported via aquatic and/or terrestrial pathways. Dose commitments are calculated for either acute or chronic exposure. The document contains a user's manual and a sample case. In the Section 1.5 of this document the code custodianship and control is described along with the status of verification, validation and peer review of this report.

0550 Regulations

REFER ALSO TO CITATION(S) 33197, 33221, 33248, 34054, 34055

33252 (NUREG/CR—3235(Vols.2-3-4)) **Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste.** (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 315p. (SAND—82-1557(Vols.2-3-4)). NTIS, PC A14/MF A01 - GPO $9.00. Order Number DE83012458.

Volumes 2, 3, and 4 are abstracted and indexed separately.

33253 (NUREG/CR—3235(Vols.2-3-4), pp 121p, Vol. 2) **Volume 2. A simplified analysis of a hypothetical repository in a basalt formation.** Pepping, R.E.; Chu, M.S.; Siegel, M.D. Apr 1983. NTIS, PC A14/MF A01 - GPO $9.00. (SAND—82-1557(Vols.2-3-4)).

In Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste.

An analysis of a hypothetical nuclear waste repository in a basalt formation has been performed to demonstrate the application of existing analytical tools to the assessment of compliance of the repository with the draft EPA Standard, 40CFR191 (Draft No. 19). The tools have been developed by Sandia National Laboratories for use by NRC in such analyses. The hypothetical site is based on descriptive and quantitative data for a candidate basalt repository in the early stages of site characterization. The effects of uncertainty in the input data on the assessment of compliance are demonstrated. Other sources of uncertainty resulting from interpretation of the standard and its probabilistic nature are discussed. The results of the calculations presented indicate that compliance with the draft standard may be achieved depending on how the term release is interpreted; namely, is the release due to a unique (single) event or does it involve all probable scenarios.

33254 (NUREG/CR—3235(Vols.2-3-4), pp 109p, Vol. 3) **Volume 3. A simplified analysis of a hypothetical repository in a tuff formation.** Siegel, M.D.; Chu, M.S.Y. Apr 1983. NTIS, PC A14/MF A01 - GPO $9.00. (SAND—82-1557(Vols.2-3-4)).

In Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste.

Potential radionuclide releases from a hypothetical tuff repository have been calculated and compared to the limits set by the EPA draft Standard 40CFR191. The areas that were examined included the radionuclide solubilities and sorption, the description of the local hydrogeology and the simulation of containment transport in the presence of fracture flow and matrix diffusion. The uncertainties in geochemical and hydrogeological parameters were represented by assigning realistic ranges and probability distributions to these variables. Ground-water flow was described by Darcy's Law and radionuclide travel time was adjusted using calculated retardation factors. Radionuclide discharges were calculated using the Distributed Velocity Method. The discharges were integrated over five successive 10,000 year periods. Our calculations suggest the following conclusions: (1) sorption of radionuclides by zeolitized tuff is an effective barrier to the migration of actinides even in the absence of solubility constraints; (2) violations of the EPA Draft standard can still occur due to discharge of ^{99}Tc and ^{14}C. Retardation due to matrix diffusion, however, may eliminate discharge of these nuclides for realistic ground-waster flow rates; (3) in the absence of sorption by thick sequences of zeolitized tuff, discharges of U and Np under oxidizing conditions might exceed the EPA standard. Under reducing conditions, however, the low solubilities of these elements may effectively control radionuclide release.

33255 (NUREG/CR—3235(Vols.2-3-4), pp 80p, Vol. 4) **Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation.** Pepping, R.E.; Chu, M.S.; Siegel, M.D. Apr 1983. NTIS, PC A14/MF A01 - GPO $9.00. (SAND—82-1557(Vols.2-3-4)).

In Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste.

An analysis of a hypothetical nuclear waste repository in a bedded salt formation has been performed to demonstrate the application of existing analytical tools to the assessment of compliance

of the repository with the draft EPA Standard, 40CFR191 (Draft No. 19). The tools have been developed by Sandia National Laboratories for use by NRC in such analyses. The hypothetical site is based on data that are representative of bedded salt geologies in the continental US. The effects of uncertainty in the input data on the assessment of compliance are demonstrated. Other sources of uncertainty resulting from interpretation of the standard and its probabilistic nature are discussed. The results of the calculations presented indicate that compliance with the draft standard may be achieved for the groundwater transport scenarios depending on which source model is used. The penetration scenarios (direct canister hit or brine pocket hit) indicate potentially serious consequences; however, these could be mitigated by proper site selection and institutional controls.

33256 **(SAND—83-0004C) Packaging of plutonium and high-enriched uranium safeguards samples for transport.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-830528—4). NTIS, PC A02/MF A01. Order Number DE83011497.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

A method for accommodating both the processing and first-level transportation packaging for plutonium safeguards samples was developed for dry samples of reduced size, to replace an older method that utilized larger samples in liquid form. This method utilizes a quartz vial sealed within a metal canister, which in turn is contained within two sealed containment vessels. This packaging has proved to be both rugged and supportive of highly accurate plutonium assay procedures: The quartz vials, when packaged properly, do not break or lose any contents under severe overtests of the normal conditions of transport; and, the standards of assay accuracy associated with a previous packaging and analysis method have been maintained. 8 figures.

33257 **Physical protection of nuclear-facilities and materials.** da Silva, A.J.C. Rio de Janeiro, Brazil; Centro de Informacoes Nuclears (1980). 56p. (In Portuguese).

The physical protection of nuclear-facilities and materials is analysed, according to a Brazilian rule.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0701 Physical Isotope Separation

33258 **Accelerators for radionuclide production.** Clark, J.C. (Hammersmith Hospital, London, England). *NBS Special Publication (United States);* No. 594, 458-463(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Of 60 questionaires sent out to institutes known to be operating accelerators, replys were received relating to 55 individual accelerators all of which had a program for radionuclide production. The majority of the noncommercially operated accelerators were seen to be concentrating their efforts on producing radionuclides which were not generally available from the 9 commercially operated accelerators. Notable exceptions however were ^{123}I and ^{201}Tl. Some of the problems encountered in the use of these accelerators for large scale radionuclide production are discussed.

0702 Radiation Sources

REFER ALSO TO CITATION(S) 34280, 34282

33259 (INIS-mf—7499, pp vp) **Indicator of air contamination with radioactive iodine isotopes.** Tomasek, M. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni); Krzesniak, L. (Centralne Lab. Ochrony Radiologicznej, Warsaw (Poland)). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

0703 Isotopic Power Supplies

REFER ALSO TO CITATION(S) 33693

08 HYDROGEN

0801 Production

REFER ALSO TO CITATION(S) 33272, 33273, 33319, 33354, 33377, 33378, 33388, 34108, 34177

33260 **Mg- and Si-doped iron oxides for the photocatalyzed production of hydrogen from water by visible light (2.2 eV ≦ h nu ≦ 2.7 eV).** Leygraf, C.; Hendewerk, M.; Somorjai, G.A. (Univ. of California, Berkeley). *Journal of Catalysis;* 78: No. 2, 341-351(Dec 1982). Contract AC03-76SF00098.

Connected polycrystalline discs of Mg-doped (p-type) and Si-doped (n-type) iron oxides produced hydrogen from water using light in the solar range (2.2 eV ≦ h nu ≦ 2.7 eV) and in the absence of any external potential. In 0.1 M Na_2SO_4 or in 0.01 N NaOH solutions the device produces hydrogen catalytically with rates of 1 to 2 H_2 monolayers per minute.

33261 **Control of photosensitized electron transfer reactions in organized interfacial systems: vesicles, water-in-oil microemulsions, and colloidal silicon dioxide particles.** Wilner, I.; Laane, C.; Otvos, J.W.; Calvin, M. (Univ. of California, Berkeley). *ACS Symposium Series;* No. 177, 71-95(1982). Contract W-7405-ENG-48.

The separation of photoproducts formed in photosensitized electron transfer reactions is essential for efficient energy conversion and storage. The organization of the components involved in the photoinduced process in interfacial systems leads to efficient compartmentalization of the products. Several interfacial systems, e.g., lipid bilayer membranes (vesicles), water-in-oil microemulsions and a solid SiO_2 colloidal interface, have been designed to accomplish this goal. An electron transfer across a lipid bilayer membrane leading to the separation of the photoproducts at opposite sides of the membrane is facilitated by establishing a transmembrane potential and organizing the cotransport of cations with specific carriers. In the water-in-oil microemulsion the separation of photoproducts is achieved by means of the hydrophilic-hydrophobic nature of the products. Photosensitized electron transfer reactions analogous to those occurring in the two half-cells are presented. The colloidal SiO_2 particles provice a charged interface that interacts with charged photoproducts. The photosensitized reduction of a neutral acceptor, propylviologen sulfonate (PVS°) by positively charged sensitizers such as $Ru(bipy)_3^{2+}$ and Zn-tetramethylpyridinium porphyrin, Zu-TMPyP^{4+}, is described. The effect of the SiO_2 interface is attributed to a high surface potential that results in the separation of the intermediate photoproducts. The quantum yields of the photosensitized reactions are correlated to the interfacial surface potential and the electrical effects of other charged interfaces such as micelles are compared with those of SiO_2. The possible utilization of the energy stored in the stabilized photoproducts in further chemical reactions is discussed. Special attention is given to the photodecomposition of water as a reaction route. 12 figures.

0802 Storage

33262 **(GEPP-TIS—702) Getter pumping speed measurements in the range 10^{-2} to 10^{-7} liters per second.** Mehrhoff, T.K.; Barnes, L.W. (General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.). 25 Apr 1982. Contract AC04-76DP00656. 21p. NTIS, PC A02/MF A01. Order Number DE83011916.

A procedure for measurement of pumping speeds several orders of magnitude below the lowest reported rates is described. The method has been found to be useful in evaluating ambient hy-

drogen pumping characteristics for small getters in the presence of trace contaminant gases (less than 0.13 micromoles). Poisoning effects are described for the action of carbon monoxide and carbon dioxide on a zirconium-titanium nickel alloy bulk getter. Results obtained indicate the poisoning effect is much less severe in the case of barium flash getters.

33263 **(NP—3770067) Project "usage of hydrogen for purposes of energy technology".** Weinzierl, P. (Vienna Univ. (Austria). Inst. fuer Experimentalphysik). Dec 1981. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770067.

Portions are illegible in microfiche products.

By pressing charged and poisoned hydride material ($CaNi_5H_4$) and by enclosing the pressed samples into a pipe of very fine-pore bronze one succeeded to develop a hydrogen store with a stable cycle and good thermal conducting properties. All in all four compressors consisting of a combination of such stores with an increasing content of hydride material were produced and tested. Check of function was carried out by measuring the hydrogen flow during the charge- and discharge process of a pair of storage units. It was found that a dead time of about 30 sec. has to be allowed for after switching to a new water temperature before opening the hydrogen valves. In that way one achieves a uniform temperature in the storage units and a corresponding hydrogen release and sorption. In order to guarantee hydrogen flow which is a continuous and as constant as possible within the compressor there are plans for the final automatically controlled demonstration plant to work with four storage units and to optimise the time delay of the switching and switching off processes.

0808 Properties

REFER ALSO TO CITATION(S) 34112

09 OTHER SYNTHETIC AND NATURAL FUELS

REFER ALSO TO CITATION(S) 33952

0901 Hydrocarbon Fuels

REFER ALSO TO CITATION(S) 33098, 33321, 33322, 33327, 33329, 33331, 33348, 33351, 33388, 33519, 33942, 34112, 34170

33264 **(AD-P—000312/9) Experimental investigation of shock initiated methane-combustion near a wall.** Keiper, R.; Spurk, J.H. (Technische Univ. Darmstadt (Germany, F.R.). Inst. fuer Technische Stroemungslehre). Jul 1981. 9p. NTIS, PC A02/MF A01.

Methane-air mixture in argon heat bath is ignited by shock, reflected from the endwall of shock tube. Experiments are compared with numerical prediction based on Bowman's reaction scheme including Zel'dovich mechanism. Agreement between experimental density profiles and numerical prediction is very good. Methane absorption outside the boundary layer agrees well with computation based on isobaric combustion. Measurements in the boundary layer, albeit with insufficient space resolution, are in accord with the predicted trends.

33265 **(DOE/ET/00260—T1) Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report.** Thomson, W.J. (Washington State Univ., Pullman (USA). Dept. of Chemical Engineering). Jan 1983. Contract AC22-78ET00260. 44p. NTIS, PC A03/MF A01. Order Number DE83011690.

Portions are illegible in microfiche products.

Fischer-Tropsch kinetic data have been obtained for a flame-sprayed iron (taconite) catalyst at total pressures up to 3.1 mPa, at temperatures between 525K and 600K and for H_2/CO ratios between 1.0 and 20.0. Attempts to correlate the kinetic data according to previously proposed kinetic schemes were not completely successful at the higher temperature, possible due to pore diffusion limitations. Empirical correlations were also attempted to determine the dependency of the olefin-to-paraffin ratio, the C_5^+ fraction of the hydrocarbon make and the CO_2 and CH_4 make gas rates on the kinetic variables. It was found that the olefin-to-paraffin ratio was inversely dependent on the H_2 to CO ratio and that higher C_5^+ fractions are favored by high pressures and moderate temperatures. The liquid products were selectively subjected to GC-MS analyses and indicated the presence of straight chain paraffins, peaking at C_8, with some olefins and branched compounds. There was a noticeable initial deactivation of the catalyst during carburization but the catalyst remained stable for a 57 hour on-stream period, once carburization was complete. Deactivation followed very rapidly but there was no indication of the reason (no coke was formed). Other catalyst loadings were found to coke severly under conditions of low H_2/CO ratio and higher temperatures ($\sim$ 300°C). It is concluded that this catalyst concept, while promising, does not produce the quantitites of liquid necessary for economic viability as a transportation fuels process. However, if catalyst activity could be maintained at its initial activity, then it is possible that a successful process could emerge.

33266 **(DOE/NBM—3011701) Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report.** (Energetics, Inc., Columbia, MD (USA)). 30 Jun 1981. Contract W-31-109-ENG-38. 71p. NTIS, PC A04/MF A01. Order Number DE83011701.

An indirect liquefaction process is being developed by Arizona State University (ASU) for the conversion of cellulosic wastes into light fuel oil. In this process the cellulosic waste feedstock is first gasified, by catalytic flash pyrolysis, then liquefied in a modified Fischer-Tropsch catalytic reactor. The liquid-fuel product is similar to petroleum refinery-produced diesel oil and No. 2 fuel oil. Depending upon the liquid-fuel conversion yield and feedstock moisture content, a high-quality by-product gas is available for sale or supplementary gaseous fuel is needed to sustain the process. The existing research-scale process development unit has an approximate feedstock capacity of 25 pounds per hour. Arizona State University proposes to construct a pilot-scale unit with a feedstock capacity of 10 tons per day. The smallest commercial scale for conversion plants of this type is about 500 tons per day. Product yield in the research-scale process development unit is currently about 10 gallons per ton of feedstock. The immediate research goal is to demonstrate a product yield of 40 gallons per ton, principally through improvement in the choice of liquefaction-reactor catalyst. The optimum product yield is reported to be approximately 100 gallons per ton. A previous economic analysis of the projected commercial-scale process assumed a yield of 80 gallons per ton of zero-moisture feedstock at a factor of 90 percent. This study examines the projected process costs at the commercial scale over the range of expected variation and uncertainty in product yield, plant factor, feedstock capacity, feedstock moisture content, and future fuel prices. The quantities of cellulosic waste feedstocks economically available over these parameter ranges are estimated. The study results allow straightforward interpretation of the national energy-conservation significance of technical progress as the R & D project continues.

33267 **(DOE/PC/50804—2) CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983.** Delgass, W.N. (Purdue Univ., Lafayette, IN (USA)). 1983. Contract FG22-82PC50804. 28p. NTIS, PC A03/MF A01. Order Number DE83011889.

The objective of this work is to examine the effects of nitrogen, as nitride and as a gas phase reactant, on hydrocarbon synthesis reactions over iron catalysts. This is the second quarterly period of a three year program. Preliminary Moessbauer and kinetic studies of bulk iron nitride phase. Procedures for preparing pure phases will be improved so that this relationship can be studied more closely. Computer simulation of transient kinetic responses has also been initiated. The reactor and kinetic description is still oversimplified, but responses qualitatively similar to those expected have been achieved. 4 figures, 2 tables.

33268 **Liquid fuels from the hydropyrolysis of biomass.** Bodle, W.W.; Wright, K.A. (Inst. of Gas Tech., Chicago, IL). *Energy Progress;* **2**: No. 3, 162-167(Sep 1982).

A process designed to produce principally liquid fuel from Hawaiian biomass has been completed recently. This system consists of short residence-time pyrolysis of solids, entrained in a hydrogen atmosphere. This technique, which has been extensively developed at IGT for conversion of lignite, is termed HYFLEX. Following reaction at about 1100°F (595°C) and 200 psig (1.4 MPa), char and liquids are separated from the reactor outlet gas. Since fuel gas is not a desirable product at the location contemplated, the remaining gas is reformed with steam for production of a high-hydrogen-content gas which is recycled to the HYFLEX reactor. Bench-scale experiments were conducted with eucalyptus wood and leucaena wood feeds to establish data for process design. This paper describes the results of the wood tests and their comparison with similar data on peat. (JMT)

33269 **Catalytic steam reforming of hydrocarbon for production of synthesis gas.** Ghosal, S.R.; Ghosh, S.C. (Fertilizer Corp. of India, Ltd., Sindra). *Chemical Age of India;* **21**: No. 2, 123-132(Feb 1970).

The performance data of a pilot scale soab naphtha reforming plant, using Fertilizer Corp. of India ring type nickel catalyst in a 2 1/4 in. ID x 3 in. OD x 13 ft long reformer tube, have been analyzed; and a rate equation has been developed. It was found that the catalyst is highly active. However, the rate given by this expression may not be realized in cases of commercial reformers with a very high outlet temperature where permissible heat flux across the tube wall may control the overall rate.

33270 **Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1.** Phillips, T.R.; Mulhall, J.; Turner, G.E. (Gas Council, Warwickshire, England). *Journal of Catalysis;* **15**: No. 3, 233-244(Nov 1969).

The reactions of n-heptane and n-hexane with steam over a nickel-alumina catalyst powder to yield fuel gas were investigated at 200 psig and 360 to 450°C. For most of this range, the activation energy for the reaction was 21 +- 1 kcal. The results were interpreted by a Langmuir kinetics mechanism, and it was shown that the relative reaction rates of hexane and heptane in mixtures depended primarily on the relative adsorption coefficients of the reactants. 25 references.

33271 **Optimization of fixed bed methanation processes.** Wen, C.Y.; Chen, P.W.; Kato, K.; Galli, A.F. *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **12**: No. 3, 104-163(1968).

Prior to optimization of methanation processes, heat exchanger optimization is performed; computer simulation of methanation process is then programmed based on kinetic information, cost information and heat and material balance; suitable techniques of optimization of methanation processes are selected and optimum conditions and designs of a various systems are found; various systems of catalytic fixed bed reactors are considered - adiabatic system, heat extraction system, cold quench system and recycle system; size of plant was for production of 250 x 10^9 Btu/day of pipe line gas. 17 references.

33272 **Water gas shift reaction. II.** Singh, S.K.; Sen, B.; Chakravorty, K.R. *Indian Journal of Technology;* **2**: No. 8, vp(Aug 1964).

In recent years, the water gas shift reaction has assumed considerable importance due to increasing commercial use of synthesis gas. It was reported earlier that the rate of reaction increases with a decrease in particle size and may fall in kinetic or diffusion zone depending on the size of the catalytic man. In this work, the effect of varing temperature, space velocity, steam/gas ratio or feed gas composition on percentage conversion while keeping all other variables constant is reported. Values of the rate constant of the reaction and the activation energy for different temperatures were also determined.

33273 **Water gas shift reaction. I.** Sen, S.P.; Sen, B.; Chakravorty, K.R. *Indian Journal of Technology;* **1**: No. 9, 341-344(Sep 1963).

The water gas shift reaction is of importance in the production of synthesis gas. The effect of particle size of Fe_2O_3-Cr_2O_3 catalyst on the conversion of CO in water gas shift reaction was studied in the range of 300 to 475°C with constant space velocity and steam/gas ratio. The percentage conversion of CO was found to increase with reduction in particle size of the catalyst with 1.39 +- 0.83 mm being the limiting size. With this particle size, practically 100% of the internal surface is available for reaction. The temperature at which 100% equilibrium conversion of CO is possible decreases with reduction in particle size.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 33322, 33332, 33349, 33388

33274 **(AD-P—000310/3) Experimental and analytical investigation of high temperature ignition of ethanol.** Natarajan, K.; Bhaskaran, K.A. (Indian Inst. of Tech., Madras. Dept. of Mechanical Engineering). Jul 1981. 9p. NTIS, PC A02/MF A01.

An experimental and analytical investigation of the ignition of ethanol-oxygen-argon mixtures behind reflected shock waves was carried out over the temperature range 1300-1700K at pressures of 1.0 and 2.0 atm and equivalence ratios of 0.5, 1.0 and 2.0. In the experimental investigation, ignition was identified by the emission of visible light in a shock tube. The time interval between the arrival of the incident shock at the end flange and the subsequent ignition indicated by the first visible light emission was reckoned as the ignition delay. The experimental ignition delay (t) data were found to correlate with initial ethanol and oxygen concentrations (mole/cc) and with initial temperature (K). A 56 step kinetic model for ethanol oxidation in the above temperature range was assembled using published rate coefficient data wherever available and estimated data for the reactions which have not been studied. Theoretical ignition delays were evaluated from the concentration profiles.

33275 **(LBL—15817) Xylose fermentation with Clostridium thermohydrosulfuricum.** Mancuso, A.; Wilke, C.R.; Blanch, H.W. (Lawrence Berkeley Lab., CA (USA)). Dec 1982. Contract AC03-76SF00098. 173p. NTIS, PC A08/MF A01. Order Number DE83012483.

Thesis.

In this study, the fermentation of xylose to ethanol with a thermophilic, strictly anaerobic bacterium, Clostridium thermohydrosulfuricum, was examined. The focus of this investigation was on the physiological parameters which most strongly affect the economic feasibility of using this bacterium for industrial ethanol production. In rich medium (containing economically impractical concentrations of yeast extract) yields as high as 0.43 gm ethanol/gm xylose and growth rates of 0.4 to 0.5 hr^{-1} were observed. The predominant by-products of the fermentation were acetate and lactate. Nutritional studies indicated that the cost of the growth medium could be dramatically reduced by replacing most of the yeast extract used with nicotinic acid and vitamin B^{12}. Ethanol was found to be very inhibitory to growth and ethanol formation. To overcome the problem of inhibition, cells were gradually adapted to high concentrations (up to 4.2%) of ethanol. However, the ethanol yield of adapted cells was typically 30 to 40% less than the yield of non-adapted cells. Environmental parameters such as pH and by-product concentrations had only a slight effect on the ethanol yield produced by tolerant cells. A mutant, selected from an adapted strain, was found to produce 60% less lactate than its parent. This low-lactate producing mutant had a slightly improved ethanol yield. The results obtained with the tolerant, low-lactate producing mutant were used in the design of an industrial-scale fermentation process. An economic evaluation of the process indicates that ethanol production with this bacterium is currently uneconomical.

33276 **(STU—79-3419) Determination of methyl nitrite in automobile exhaust gases.** Bertilsson, B.M. (Styrelsen foer Teknisk Utveckling, Stockholm (Sweden)). Nov 1980. 18p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750518.

Portions are illegible in microfiche products.

The content of methyl nitrite in exhaust gas was determined, for vehicles fueled with M15 (gasoline with 15 per cent methanol) and methanol/diesel. For Otto-engines using M15, the methyl nitrite emissions vary between 0.02 and 0.1 ppm depending on the load. The nitrogen oxides content varies between 280 and 1700 ppm. For a diesel engine eith a two-fuel system (methanol/diesel) the methyl-nitrite content varies btween 0.02 (detection limit) and 4.8 ppm. The high value was recorded at a very low load. A oxidizing catalyst (Pt) reduces the amount of methyl nitrite. The nitrogen oxides content varies between 200 and 1100 ppm.

0903 Inorganic Hydrogen Compound Fuels

REFER ALSO TO CITATION(S) 33388, 34112

33277 **Standard enthalpy of formation of peroxymonosulfate (HSO_5^-) and the standard electrode potential of the peroxymonosulfate-bisulfate couple.** Steele, W.V.; Appelman, E.H. (Argonne National Lab., IL). *Journal of Chemical Thermodynamics;* **14**: 337-344(1982).

The standard enthalpy of formation at 298.15 K of the aqueous peroxymonosulfate ion, HSO_5^-, has been determined by reduction of the ion in aqueous HI. The value obtained is Δ H/sub f/ $^0(HSO_5^-,aq) = -(798.4 +- 2.5) kJ.mol^{-1}$. This enthalpy was combined with an estimated entropy for the aqueous ion to yield a standard electrode potential of (1.82 +- 0.03) V for the aqueous half-reaction: $HSO^-_5 + 2H^+ + 2e^- = HSO_4^- + H_2O$. This potential is substantially greater than that derived from electrochemical measurements and implies that HSO_5^- is a considerably more powerful oxidant than has been generally recognized.

0904 Solid Waste And Wood Fuels

REFER ALSO TO CITATION(S) 33341, 33346, 33935

33278 **(IVL-B—679) Experimental firing with Brini, at Eksjoe, April 1981.** Ahling, B.; Lunden, L.; Edner, S. (Institutet foer Vatten- och Luftvaardsforskning, Stockholm (Sweden)). Feb 1982. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750519.

Portions are illegible in microfiche products.

Experimental firing with BRINI pellets, which are made from the combustible fraction of household waste, has been carried out in a 10 MW fluidised bed combustion boiler. The results indicate that good combustion efficiency was obtained. Emission of polynuclear aromatic hydrocarbons was low. Release of chlorinated organic compounds and dust emission were also at a low level. Experiments to study the effect of firing with a micture of BRINI and wood chips, in order to reduce HCl emission, were not conclusive because of difficulties in mixing the fuels.

13 Economics And Management

REFER ALSO TO CITATION(S) 33625, 33626

1306 Environmental Aspects

REFER ALSO TO CITATION(S) 33066

14 SOLAR ENERGY

33279 **(TAC-SPG—82-004) Solar power generation: a bibliography with abstracts. Quarterly update, October-December, 1982.** (New Mexico Univ., Albuquerque (USA). Technology Application Center). Apr 1983. 148p. Univ. of New Mexico, Technology Application Center, Albuquerque, NM 87131.

This bibliography contains citations taken from the NASA file and DOE Energy Data Base on the following subjects: energy overviews; solar overviews; energy conservation; economics, law, and policy; total energy, hybrid and combined systems, and repowering; solar thermal power, heliostats; thermoelectric, thermionic, and thermochemical; OTEC, ocean kinetic, and osmotic energy; wind energy; biomass, bioconversion, biochemical, and photochemical; and energy storage and hydrogen.

1401 Resources And Availability

33280 **Graphs of average monthly insolation at arbitrary tilt and orientation.** Hodges, L. (Ames Lab., IA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 397-401(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

An elegant and useful method of presenting insolation information at arbitrary tilt and orientation is to plot contours of equal insolation on a graph which has concentric circles of equal surface tilt and radial lines corresponding to compass directions. These graphs can be prepared for annual, monthly, hourly, or daily periods; for total, direct, diffuse or reflected insolation; for average or clear-day insolation; and so forth. They may be prepared using any suitable method of calculation. The nature and use of these graphs is discussed, and the construction of monthly average daily insolation graphs is described.

33281 **CLIME: a climate analysis computer program.** Reeves, B. (Arizona State Univ., Mesa). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 402-404(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A computer program designed to analyze hourly climatic data is presented. The program's input, processes, and output are identified. A brief description of each of the fourteen tables and graphs produced is included. Data interpretation approaches are suggested and briefly discussed.

33282 **Merged solar and meteorological data base for solar energy use.** McKay, D.C. (Atmospheric Environment Service, Downsview, Ontario). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 409-413(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Any evaluation of a solar system whether active or passive requires as input climate data. In most cases, the information required is not available at the site in question. In order to increase the climate data available for applications in the renewable energy field, work on the definition and development of a merged solar and meteorological data base was undertaken and an archive established. Results from this archive for a number of sites across Canada can now be provided in raw form on magnetic tape or in the form of hard copy summaries. The methodology of how the merged data base was established will be discussed. Also, some examples for illustrative purposes will be presented to indicate how the data base is ideally suited to support activities in the active and passive solar system design fields.

1403 Economics

REFER ALSO TO CITATION(S) 33381, 33411, 33493, 33502

33283 (CONF-810622—Vol.2, pp 649-658) **Review of OTEC energy cost calculations.** Manley, R.N. (MITRE Corp., McLean, VA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A review of a simplified revenue requirements model for a synthetic utility application is presented, illustrating the three components of energy cost. An example illustrating the use of the revenue requirements technique in arriving at a single value for the cost of energy from an Ocean Thermal Energy Conversion (OTEC) plant is then illustrated. A cash flow interpretation of the cost of

energy resulting from the investment in the OTEC technology is then presented. It is based on the unit cost of energy as calculated by the revenue requirements method and the original assumptions. From the annual revenues generated by the sale of energy at the rate calculated by the revenue requirements model, costs of amortizing capital, payment of taxes, operating, maintenance and fuel costs are deducted on a yearly basis. At the end of the system life, all capital expenses (including return on equity), fuel expenses, and operating expenses are seen to equal to revenues generated from sale of the product.

33284 (CONF-810622—Vol.2, pp 659-663) **OTEC: estimating total systems benefits and costs.** Kasturi, P. (Univ. of Hawaii, Honolulu). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Mini OTEC has clearly demonstrated the technology for this energy supply option to be reliable, safe and sound. However, the very low priority accorded OTEC in the Reagan energy budget is seen to jeopardize its chances of early market penetration and successful commercialization. This paper attempts to develop guidelines for a reappraisal of the OTEC program viewed in a national perspective. First, it identifies all relevant costs and benefits associated with OTEC power systems. Second, it clarifies the treatment of certain items of cost in the analysis. Third, it discusses certain externalities and linkage effects of the program and fourth, explores the ripple effect in the domestic economy and cautions against erroneous double counting. A successful determination of social profits in the OTEC program is seen to emerge from a careful adherence to various economic concepts discussed in the paper.

33285 (CONF-810622—Vol.2, pp 811-814) **OTEC: a business strategy perspective.** Erickson, E.L. (Resource Planning Associates, Inc., Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The business manager considering an Ocean Thermal Energy Conversion (OTEC) project faces many complex issues. These issues are compounded by a number of uncertainties and a long, often risky payoff period. Moreover, because the federal government will probably take a much less active role in commercialization of alternative energy technologies, top decision makers need more than ever to understand the technical, industrial, market, economic, environmental, and institutional variables affecting any new, energy-related investment decision. This paper presents an analytical framework and methodology for making a strategic decision, based on an analysis of risks, vulnerabilities, and opportunities facing the decision maker. The approach to strategy development is presented and applied to a hypothetical commercial-scale OTEC project.

33286 (CONF-810622—Vol.2, pp 815-819) **Domestic social and economic impacts of OTEC commercial development.** Lawrence, M.F.; Morrison, T.A. (Jack Faucett Associates, Chevy Chase, MD). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The widescale domestic developmet and utilization of OTEC power plants would have a significant impact upon the economy of the United States. This paper describes the detailed economic impact analysis undertaken to identify these economic impacts and to measure them at the national, regional, and industry levels. It focuses on the impacts generated under a likely OTEC development scenario, dividing them into direct, indirect, and induced effects. These impacts include employment and production effects, tax revenue effects, and the effect on the balance of payments.

33287 (CONF-810622—Vol.2, pp 867-871) **Cost targets for OTEC: the impact of innovative financing.** Lotker, M.; Gilbert, B.J.; Rosenblatt, J.A. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Economic analyses leading to determination of cost targets for Ocean Thermal Energy Conversion (OTEC) systems have generally considered electrical utility or heavy industry financing techniques. This is logical and expected since these industrial sectors represent the long-term and principal market for OTEC technology. However, the passage of a number of recent laws suggests an opportunity for application of a type of financing common in the buildings sector, syndication of limited partnerships, to OTEC in an innovative way. This paper explores the background, process and cost-target implications of such tax-advantaged and tax-sheltered financing to the early stages of OTEC commercialization. The paper briefly recaps the elements of recently passed legislation (the OTEC Act of 1980, the OTEC RD & D Act, and the Crude Oil Windfall Profits Tax Act) and their implications for OTEC financing. The principles behind tax-sheltered and tax-advantaged investment options and financing is examined in light of the technological (e.g., maximum MW ratings) and business (e.g., risk allocation) constraints associted with such techniques. The paper concludes with presentation of pro forma cash flows and capital cost target estimates for OTEC ventures that are financed as Small Power Producers and owned by limited partnerships whose investors can take advantage of financial leverage of MARAD financing and the substantial Energy Tax Credits.

33288 (CONF-810622—Vol.2, pp 873-877) **Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC) central station.** Gritton, E.C.; Hess, R.W.; Pei, R.Y. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

An engineering performance and cost model is used to estimate the potential cost reductions if certain improvements are realized in the engineering, construction, and financing of the OTEC system.

33289 (CONF-810622—Vol.2, pp 883-887) **Financing of OTEC projects.** Delia, A.M. (Gibbs & Hill, Inc., New York, NY). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A key item that will impact the implementation of a commercial OTEC project is the availability of attractive tax incentives. A summary is given of some of the incentives available under the present fiscal structure and under various public programs. The continuation of some of these programs is uncertain. It is probable that an OTEC project would benefit from the following: (a) Investment tax credit (ITC) of 25.0 to 30.0% available to solar projects. The credit may be deducted in the first year of operation, but can be spread over several years or carried forward in its entirety and applied against future income. (b) Accelerated depreciation writeoffs, with the specific details depending on the particular types of equipment used. (c) DOE direct funds investment (available under current programs), i.e. cost sharing for production facilities. (d) Leveraged leasing and/or tax-sheltered financing, but contingent on the availability of US government guarantees. (e) Federal loan guarantees for investors. (f) Maritime Administration Title XI mortgage guarantees. These are essential for the successful financing of the project. Other incentives that can be pursued include: government-furnished equipment for production facilities; cost differential subsidies and guaranteed purchases; and federally guaranteed loans for manufacturers. Potential ownership options to be reviewed will include both private and public investors as well as combinations of both.

33290 (CONF-810622—Vol.2, pp 889-898) **Estimate of OTEC costs and electric market potential.** Manley, R.; Bluestein, J. (MITRE Corp., McLean, VA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

One key economic requirement for the commercialization of ocean thermal energy conversion (OTEC) is that it produce electrical energy at a cost competitive with baseload sources of electricity generated using fuels such as oil, natural gas, coal and uranium. A

review of OTEC energy costs in comparison with other technnologies is presented and the method by which they are calculated is also discussed. Based on the estimated probability of least energy cost, the technology characteristics presented and the prevailing economic assumptions, OTEC could provide from 6 to 14 GWe of capacity by the year 2000 depending on scenario.

33291 (CONF-810622—Vol.2, pp 899-907) **Sensitivity of OTEC product prices to financial parameters.** Lavi, A. (ERDI, Inc., Pittsburgh, PA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

OTEC is perceived as a baseload power source that may compete regionally with oil-fired and possibly, coal-fired power plants. In this paper, I examine the sensitivity of electricity cost to economic and financial parameters. I first derive a single formula for calculating the price of electricity produced by oil/coal power plants and then derive the maximum capital cost at which investment in an OTEC enterprise produces the same return on investment as may be produced from a fossil fuel power plant. The financial/economic model is based entirely on net annual cash flow discounted at a given after-tax rate. I then compute the present value of the cash stream over the planning horizon of the plant. The parameters included in the model are: capital cost; operation and maintenance; capacity factor; fuel cost (if applicable); interest rate; debt ratio of enterprise; inflation rate; tax rate; investment tax credit; depreciation schedule; plant life; expenses during construction; construction period; fuel price escalation; electricity price escalation and others. Using the methodology developed for the electric mission. I derive the affordable capital cost of a plantship producing ammonia from OTEC electricity for a given price of ammonia delivered to shore. The ammonia may be sold to a wholesale distributor or it may be desynthesized into hydrogen and nitrogen. The hydrogen can be sold as fuel at a price based on its heat content only. Alternately, the ammonia may be piped to a utility which may then use it as the feedstock for a fuel-cell plant that produces electricity. It is concluded that in certain markets, OTEC may readily compete with coal-fied plants beginning in 1995 if OTEC's capital cost falls within the $3000 to 3500/kw range in (1980$). At an ammonia price of $240 s.t. (in 1980$), an OTEC plantship must cost no more than $2000 to 2500/s.t. depending on the debt ratio of the enterprise.

33292 (CONF-810622—Vol.2, pp 909-913) **Financing ocean thermal energy conversion projects with existing US maritime aids.** Miller, E.P. (Kominers, Fort, Schlefer, & Boyer, Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Signed into law August 3, 1980, the Ocean Thermal Energy Conversion Act of 1980, Pub. L. No. 96-320 (the Act, 1936, as amended (the Merchant Marine Act), Title II, makes available to assist industry in financing the construction and operation of ocean thermal energy conversion (OTEC) projects four types of federal aid that have been successfully administered in support of the United States merchant marine by the Maritime Administration (MARAD) in the Department of Commerce. The four maritime aids are construction differential subsidies (CDS), operating differential subsidies (ODS), tax deferral of earning through use of capital construction fund (CCF), and loan guarantees (Title XI), all authorized by the Merchant Marine Act). The purpose of this paper is to describe the nature of the benefits that are available under these programs and to note the eligibility requirements and restrictions that apply to projects that participate in them.

33293 (CONF-810622—Vol.2, pp 941-945) **Introductory study of the economic factors favorable to an OTEC electric power generation station on Saipan, Commonwealth of the Northern Mariana Islands.** Chan, G.L. (Commonwealth Energy Office, Saipan, Mariana Islands). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper discusses factors favorable to Saipan as an ideal site for an OTEC electric power generating station. Since the prime purpose of an OTEC facility is to eliminate the purchase of nonrenewable fossil fuel for electric power generation, this paper includes and illustrates how savings in fuel costs could be applied towards amortizing the major part, if not all of the Capital needed for construction of an OTEC electric power generating station.

33294 (CONF-810622—Vol.2, pp 947-956) **Market potential for OTEC in developing nations.** Dunbar, L.E. (Science Applications, Inc., La Jolla, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A comprehensive survey has identified ninety-eight nations and territories with direct access to an adequate OTEC thermal resource within their 200 nautical mile exclusive economic zone. A market assessment study of 67 free market developing nations and US Territories was conducted to evaluate the OTEC market potential and identify those nations with the greatest potential for utilizing OTEC in the 1986 to 2010 time period. This potential was defined based on assessments of the OTEC technology, resource, market, and barriers and incentives to OTEC implementation. The results of the study indicate significant market potential for OTEC in the candidate developing nations and territories. The OTEC resource is excellent with as much as 24°C Δ T in close proximity to shore in many of these nations. The broad range in size of electric power systems results in a market for small 10 to 40 MW commercial OTEC units in the near term 1986 to 1995 as well as the larger 100 to 400 MW commercial OTEC units in the 1995 to 2010 time period. The overall market potential in the 76 candidate developing nations and territories is represented by the projected addition of 577,000 MWe of new baseload electric power generation facilities between 1990 and 2010. This is equivalent to 50 quads of energy per year or 10,000 mboe in the year 2010 and represents a potential for nearly 3000 OTEC plants in sizes from 10 to 400 MW. The degree of penetration of this market is dependent on many factors. However, if only 10% of the market is penetrated, it represents a potential for about 300 OTEC units by 2010 at an estimated capital cost of about $171 billion (1980 dollars). This is a formidable investment but, if implemented, would result in an estimated cumulative displacement of $343 billion (1980 dollars) of imported oil by 2010.

33295 **(SV-SOL—1982-1) Air/water heat pumps for three houses in Gothenburg (Sweden).** (Swedish State Power Board, Vaellingby). 1982. 20p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750536.

Portions are illegible in microfiche products.

A Swedish project for development of heat pumps for small houses is described. Technical data and design for a set-up is reported. Results are evaluated.

33296 **Life-cycle cost economic optimization of insulation, infiltration and solar aperture in passive solar houses.** Robinson, D.A. (Honeywell, Inc., St. Paul, MN). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 218-222(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The lif-cycle cost economic optimization of passive solar residential structures has been performed using Typical Meteorological Year(TMY) data for Madison and Albuquerque. Optimum south facing glass areas and insulation values were found for eight design options at each locations: (1) high and low air infiltration rates, (2) windows with and without night insulation, and (3) single-day and three-day average insolation values.

33297 **Denver Metro Solar House: incremental costs and payback analysis.** Taylor, R.D. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 571-573(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This paper will analyze the costs incurred by a builder involved in the Denver Metro Homebuilders Program in his effort to Go Solar. The predicted space heating requirements of three different thermal designs of the same house will be correlated with the costs incurred for each design to produce payback analyses. The

methodology presented here will be used to analyze the remaining eleven houses involved in the Denver Metro Program in the future. Of particular interest in comparing the results of the twelve houses is the determination of which ones came closest to optimizing the investments in heat loss reduction and passive solar measures as to cost and thermal performance.

1404 Environmental, Legal, And Institutional Aspects

REFER ALSO TO CITATION(S) 33286, 33373, 33397, 33491

33298 (CONF-810622—Vol.2, pp 849-852) **Ocean Thermal Energy Conversion: the evolution of an industry through regulation.** Martin, L.F. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper reviews the legislative history leading to passage of the Ocean Thermal Energy Conversion Act of 1980, Public Law 96-320 (the Act); briefly analyzes the major provisions of the statute; and documents the efforts of the executive branch to respond to the mandate of the Act. Particular emphasis is placed on examination of the approach taken by the National Oceanic and Atmospheric Administration (NOAA) as lead agency in implementing the one-stop licensing provisions of the Act.

33299 (CONF-810622—Vol.2, pp 857-858) **OTEC and the EPA permitting process.** Walentowicz, R.; Hiller, M. (Environmental Protection Agency, Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The statutory responsibilities of the Environmental Protection Agency (EPA) to issue National Pollutant Discharge Elimination System (NPDES) permits under Section 402 of the Clean Water Act (CWA) to ocean thermal energy conversion (OTEC) facilities are presented. The paper contains an issuance of NPDES permits including application and information requirements, development of effluent limitations, and ocean discharge criteria considerations. Section 301 of the CWA prohibits the discharge of any pollutant without an NPDES permit or in violation of the terms and conditions of a NPDES permit. NPDES permits contain technology based effluent limitations or effluent limitations to meet the water quality standards of the receiving waters. Since OTEC facilities represent a new industrial category, EPA will have to identify treatment technology, best management practices, and best engineering judgment for these facilities to establish appropriate permit conditions. In addition, the final Ocean Discharge Criteria under Section 403 (c) of the CWA may require more stringent effluent limitations for discharges to the territorial seas, contiguous zone, and the oceans to prevent the degradation of marine waters. The paper presents some of the concerns contained in this criteria and mentions the ramifications of the determinations of unreasonable degradation and irreparable harm on NPDES permit issuance.

33300 (CONF-810622—Vol.2, pp 859-861) **Regulatory authorities of the US Army Corps of Engineers over OTEC projects.** Gay, F.T. III. (Army Corps of Engineers, Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The US Army Corps of Engineers has regulated work in navigable waters for 91 years, since the passage of the River and Harbor Act of 1890. Originally designed to protect only navigation, the Corps' regulatory program has evolved into an important, full-scale mission that protects the full public interest, balancing both protection and utilization of important resources. As the program expanded over the last decade - reflecting increased public concern for environmental protection - it also grew more complex. This report aims to lessen that complexity by providing basic, general information on the authorities governing the program, the activities regulated, and Corps program policies.

33301 (CONF-810622—Vol.2, pp 863-866) **Regulation of OTEC energy and energy product equivalents.** Keith, K.M. (State of Hawaii, Honolulu). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

One area for inquiry is the regulation of the energy and energy product equivalents which will be produced by OTEC plants. An energy product equivalent is defined in the Ocean Thermal Energy Conversion Research, Development, and Demonstration Act as an energy carrier including, but not limited to, ammonia, hydrogen, or molten salts or an energy intensive commodity, including, but not limited to, electrometals, fresh water, or nutrients for aquaculture. This paper will briefly consider the regulation of both OTEC energy and energy product equivalents under existing laws.

33302 (CONF-810622—Vol.2, pp 879-882) **Effect of PURPA on OTEC economics.** Eskander, S.S. (Gibbs & Hill, Inc., New York, NY). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Under the National Energy Act of 1978, the electricity surplus of an Ocean Thermal Energy Conversion (OTEC) system must be purchased by the electric utility if the OTEC system is owned by a non-utility entity. In order for an OTEC system to be considered as a qualifying small power production facility, it should meet certain standards which will be addressed in this paper. The Public Utility Regulatory Policies Act (PURPA) of 1978 covers the topics of cogeneration and small power production under Title II. Under PURPA, the electric utilities must sell and purchase electric power to and from the OTEC systems owner. The electricity purchase prices are to be based on the utility's avoided capacity and energy costs. Various methodologies of calculating the avoided costs will be discussed in this paper. These different methodologies are based on similar principles which include fuel displacement, fuel cost escalation, fuel use distribution, operation, and maintenance costs and capacity credits. This paper will also discuss other factors that determine avoided energy and capacity costs. These factors include the utility's system characteristics, such as generation mix, system reliability, load characteristics, fuel mix, planned generation and transmission facilities, geographical location, access to fossil fuel and their availability, etc. Recommendations on how the avoided energy and capacity costs are calculated will also be made.

33303 (CONF-810622—Vol.2, pp 915-917) **OTEC legislative needs.** Norling, R.D. (National Oceanic and Atmospheric Administration, Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

During 1980 the Congress recognized the strong potential of ocean thermal energy conversion by passing two new laws. This paper discusses the process of implementing the two new laws, with emphasis on possible amendments which would clarify the intent of the Congress in passing the OTEC Act of 1980. The adoption of technical amendments to the OTEC Act would simplify its implementation and provide a sound legal basis for each step in the OTEC licensing process.

33304 (CONF-810622—Vol.2, pp 919-922) **State of Hawaii public sector OTEC program.** Keith, K.M. (State of Hawaii, Honolulu). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Hawaii is committed to the development of ocean thermal energy conversion (OTEC). Many factors are essential to successful development. These factors include the state of the technology, the availability of financial support, and the establishment of a legal regime. It is also essential to develop good homes for OTEC plants. This paper review the role which public agencies in Hawaii have played in regard to all the factors essential for OTEC success.

33305 (CONF-810622—Vol.2, pp 923-926) **Florida Ocean Thermal Energy Consortium.** McCluney, R. (Florida Solar Energy Center, Cape Canaveral); Rotundo, L.; Block, D.; Brown, A. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

In response to congressional initiatives in the area of ocean thermal energy, the state of Florida formed a multi-agency, multidisciplinary team of individuals who set up a non-profit corporation entitled the Florida Ocean Thermal Energy Consortium, Inc. (FOTEC). FOTEC consists of key state agencies, the Governor's Energy Office, the Florida Solar Energy Center, the Florida Institute for Oceanography, a municipal utility coordinating group, and City Electric System of Key West. Formed in late 1980, FOTEC has submitted to the Department of Energy a proposal for the construction of a 40 megawatt pilot plant off shore of Key West, Florida. TRW, Inc., of Redondo Beach, California, was selected as the system integration contractor on this project. The consortium itself is unique, in that it combines the resources of the state and private interests in addressing a common problem: the development of an OTEC pilot plant for the generation of electrical energy in a state that is heavily dependent upon oil for its present electricity.

33306 (CONF-810622—Vol.2, pp 927-936) **Puerto Rico and the Puerto Rico Electric Power Authority OTEC commitment.** Marina, J. (Puerto Rico Electric Power Authority, San Juan). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper describes Puerto Rico's current OTEC activities, expectations for the future, and some possible options in the development of OTEC for Puerto Rico. In 1979, PREPA proposed cost sharing the development, construction and demonstration of a 100A megawatt Commercial OTEC Electric Power Generating plant to operate in the mid to late 1990's (PROTEC). To reinforce this commitment and update the concept, PREPA is evaluating a modified PROTEC proposal in 1981 calling for larger power modules and an earlier commercial certification date in the 1990 to 1991 period. The OTEC DOE work in Puerto Rico has been focused on defining the OTEC resource and the ocean environment adjacent to the southeast end of Puerto Rico. Here, at Yabucoa Bay and Punta Tuna, a sharp sea bottom drop off brings the ocean thermal resource to within less than two miles of land. This field work has been backed up by several economic and financial studies. PREPA has assumed both the role of prime contractor and that of joint participant with another consortium. We have offered to build the first OTEC commercial plant or buy electric power from a separate Puerto Rico generating company. Future Puerto Rico OTEC options envision: a full development (multiple OTEC plants) of the Punta Tuna-Vieques ocean thermal resource for OTEC power; the expansion of close-in OTEC installations (land, fixed platforms and moored plants) at other Puerto Rico locations; the development of distant deepwater moored OTEC electric power generating plants; potential Puerto Rico industrial scenarios appropriate to OTEC Grazing Plants in the vicinity of Puerto Rico; and, a Puerto Rico program to expedite the utilization of commercial OTEC by the islands of the Caribbean, the United States and the third world nations.

33307 (CONF-810622—Vol.2, pp 937-940) **Impact of the OTEC Act of 1980 on OTEC operations outside US waters.** Bleicher, S.A. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The availability of US licenses for OTEC facilities and plantships designed to serve foreign markets raises complex questions of law, development strategy, and national policy. OTEC facilities located outside US waters and not connected to the US by cable or pipeline must be licensed by the US if they are documented in the US; eligibility for documentation depends on US citizen control, which can be readily arranged, rather than beneficial ownership. OTEC plantships must be licensed in the US if a US citizen is engaged in ownership, construction, or operation; consequently the US licensing requirement is difficult for US citizens to avoid. OTEC facility developers should decide whether the benefits of US licensing - regulatory certainty, protection from other OTECs, and diplomatic protection - outweigh the burdens - license conditions, US transport and labor priorities, and diligence requirements. The differential treatment of OTEC plantships as compared to offshore OTEC facilities neither promotes exports nor maximizes US control of OTEC units.

33308 **(PB—83-133173) Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report.** Meriaux, S.; Aussenac, G.; Ottorini, J.M.; Turc, L.; Marin-Lafleche, A. (Commission of the European Communities, Luxembourg). [nd]. 108p. NTIS, PC E06/MF E06.

The purpose of the study is to determine the physical productivity of land in France in relation to soil/climate factors. Two approaches have been used:-The synthetic, which takes account of established correlations between actual production and a single variable, quantifiable at the various locations; it estimates the forestry and grassland potentials of France: the analytical, which utilizes significant, basic variables of output which together determine those potentials. This work has shown that the complimentarity of the methods of approach and the combination of the variables will enable the production of biomass to be determined.

33309 **What do homeowners think?.** *Solar Age;* 6: No. 4, 22-26(Apr 1981).

During October and November of 1980, The Gallup Organization, Inc., conducted personal interviews with a national probability sample of 2,023 homeowners for the Solar Energy Research Institute (SERI). The results tell what owners of year-round housing think about solar energy and what factors may motivate them to use solar in their homes. Descriptive findings for a few key questions in the survey, together with brief interpretative comments by SERI are included. (JMT)

33310 **Making of a solar village.** Becker, W.S. (Wisconsin Energy Extension Service, Madison); Hirsch, T. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 467-470(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Key features are described of a successful partnership between local officials, small businessmen, technicians and design professionals in the creation of a solar-heated central business district at Soldiers Grove, Wisconsin. Discussed are the village's needs for technical assistance, how those needs were met and how local government facilitated solar development.

33311 **Ashland, Orgen's solar strategy.** Fegonese, J.A. (City of Ashland, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 476-480(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The conceptualization, implementation, and experiences of a small southern Oregon community in attempting to increase the energy efficiency of new residential developments is outlined. The two main ordinances used are (1) a city-wide solar access ordinance, which establishes a special solar setback in the city, and (2) a new development code for housing, which provides for powerful incentives for passive solar housing. Successes and insights gained from the experience are discussed.

33312 **Solar siting and access protection in new development.** King, S. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 481-483(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Solar access and siting ordinances adopted and proposed by local governments in Washington state are summarized; techniques used by developers to protect solar access in new developments are described; and a framework for assessing energy savings from adoption of solar access and siting ordinances is proposed.

33313 **Native self-reliance.** Reiniger, C. (Designwrights Collaborative, Inc., Santa Fe, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 489-493(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The large resources of the land held by American Indians are described, followed by indications of impoverished Indian life and some reasons for it. Self-reliance is identified as the key to improving these conditions, and appropriate technology, ash historically practiced by American Indians, is seen as a menas of achieving self-reliance. This includes houses that are owner-built from local materials, oriented to take advantage of the sun, and heated with wood or local coal. Interest in appropriate technology among Indians is discussed. Programs include wind power, aquaculture and weatherization and solar energy application and alternative agriculture programs. Excerpts are presented from a slide tape show documenting work being done on six reservations. (LEW)

33314 **Approaching the retrofitting market successfully.** Walsh, V. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 542-546(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

As a relatively new market, passive solar retrofitting must continue to gain public confidence and acceptance. Homeowners need the assurance that their solar investment is in the hands of a designer/builder who can successfully execute the design and construction. Credibility, through reputation and track record, is a quality that potential clients look for. Acquiring solar retrofit contracts requires a creative marketing approach by a qualified contractor. Various approaches to retrofit contracts are addressed.

33315 **Solar access as an investment strategy for builders.** Kaufmann, J. (Oregon Dept. of Energy, Salem). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 552-556(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Solar access has major implications for the widespread use of passive solar energy. Reasons why builders should support local efforts to provide and protect solar access are discussed. Solar access primarily is consumer protection. However, solar access can also be an investment strategy for builders, developers, and others.

33316 **Solar access laws can benefit developers.** Brewer, D.J. (Eugene Water and Electric Board, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 557-561(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

There is a general feeling among developers in the Pacific Northwest that incorporating solar access into new development requires technical skills, complicated design calculations, and a great deal of extra time and money. What many developers in Oregon are finding out, however, is that designing for solar access is relatively simple, and can be quite lucrative. A simplified method of incorporating solar access into new development is outlined. The method is one developed in the City of Eugene, Oregon, to help developers address local solar access requirements. It follows basic design steps used by developers when preparing subdivisions or planned unit developments. It uses climate and zoning information specific to Eugene, but can easily be revised to address the specific conditions of almost any area.

33317 **Solar homebuilders program: getting builders to build solar.** Parkin, B.; Allen, D. (Western Solar Utilization Network, Portland, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 574-577(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The homebuilding industry can open the way to wide-scale residential use of solar energy. Under the Northwest Power Act, the Department of Energy's Bonneville Power Administration, Western Solar Utilization Network and the Solar Energy Research Institute are working together with the Home Builders Association of Metropolitan Portland and the Portland chapter of the American Institute of Architects on a program that will affect 7 cities in the Pacific Northwest. Modeled after the successful Denver Metro Homebuilders Program, the project is being implemented in 3 cities in 1981 and three additional cities in 1982. In each of the 7 cities builders and developers will be provided with design, performance monitoring and marketing assistance for constructing passive solar prototypes. The result is ten passive solar homes of superior design and of an affordable price in each city. The secondary result of this program is expected to be a total of 2700 solar homes produced outside the program by builders from 1981-1985. Builders influenced to build passive solar homes outside the program could result in as many as 500,000 homes produced by the year 2000.

33318 **Marketing passive solar energy to the building industry.** Rush, P. (Sumner Rider and Associates, New York, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 581-583(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The first national marketing effort of the passive solar design concept which was conducted in 1980-1981 is examined. The prime audiences for this program were builders, remodelers, building material distributors and dealers, architects and the home buying public. To effectively implement this publicity campaign, four steps were necessary: 1. catch the audience's attention; 2. convey a direct and clear message; 3. reinforce the message; and 4. motivate the audience to action. While there are many different avenues to approach any target audience, SRA chose its proven methods of reaching the building community. Trade press, direct mail, industry events, conferences, editorial supplements and newspaper services were used to implement this highly successful program. How each strategy was chosen and implemented will be discussed. The results of the program will be displayed and examined.

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 33260, 33266, 33268, 33275, 33278, 33379, 33519, 33876, 33935, 33942, 34019, 34177, 34188, 34199, 34582

33319 **(BMFT-FB-T—83-036) Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion.** Hamer, E.; Moehwald, H.; Obkircher, B.; Schaefer, W.; Schroeder, B. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 333p. (In German). NTIS (US Sales Only), PC A15/MF A01. Order Number DE83750867.

Portions are illegible in microfiche products.

The objective of the study is to elaborate those methods of photochemical, photoelectrochemical and biological solar energy conversion that may be used economically in the far future. Therefore the methods are analyzed with respect to present status and possibilities of development, physical and technical limitations, cost of use in possible applications. The most promising of the methods investigated is the photoelectrochemical generation of electricity. In special cases the production of biomass makes sense, whereas the production of methanol by solar energy may become useful under especially favourable conditions. The other methods investigated, among them also those that produce hydrogen by means of sun light, cannot be used economically in regions of temperate climate.

33320 **(CONF-8105214—) Policy issues in Ethiopian energy development.** (Vetenskapsakademin, Stockholm (Sweden). Beijerinstitutet). May 1981. 71p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750483.

From International workshop policy issues in Ethiopian energy development; Nazareth, Ethiopia (15 May 1981).

Portions are illegible in microfiche products.

One of the most serious constraints to current survival and future development in Ethiopia is energy. The question of energy for survival is dependent on biomass which is being rapidly depleted;at the current rate of deforestation, Ethiopia will be bare of forests in 20 years. There are several points to emphasize in establishing a forestry policy which include: 1) Accurate costing of per unit of production 2) Selection of appropriate species by ecological zone 3) Land management improvements 4) Suitable Land Tenure Systems It is possible to outline general principles for energy-forestry management, namely: 1) Around densely settled

areas, encourage the production of trees as a cash crop 2) In dry areas, encourage agroforestry to enchance total biomass productivity 3) Require state farms and all new settlement as far as possible to be self supporting in fuel through settlement woodlots 4) Enforce 'Green (Energy) Belts' around major urban areas. Without forestry, there will be no fuel. Except for hydroelectricity and geothermal, there are no substantial, really proven indigenous reserves: even the exploitation of hydropower and geothermal potential is totally dependent on foreign technology.

33321 **(DOE/CH/10104—1) Semi-automatic wood gasifier coupled with an adjunct oil-fired boiler/burner unit.** (New England Fuel Inst., Watertown, MA (USA)). [nd]. Contract AC02-82CH10104. 89p. NTIS, PC A05/MF A01. Order Number DE83011191.

Portions are illegible in microfiche products.

The rationale, design recommendations, installation, and operations report are included. The burner is a modified Carlin gun type oil burner. (MHR)

33322 **(DOE/NBM—3012263) Report on biomass energy.** (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). Nov 1981. 120p. NTIS, PC A06/MF A01. Order Number DE83012263.

Portions are illegible in microfiche products.

The objectives of this report are to explore the potential of biomass energy systems as a renewable resource to contribute to the US fuel supply, and to suggest research needed to accomplish this goal over the next 2 decades. This report analyzes energetics and economics of biomass use, and possible impacts on agriculture, forestry, land use, environment, and society. The complex questions that relate to the many biomass sources and the numerous energy conversion technologies are identified. Prime attention is given to the research needed to develop biomass sources and improve conversion technologies to maximize the net additional energy available from biomass.

33323 **(EUR—8159-FR) Study of solar module technology with good thermal dissipation. Final report.** Diguet, D.; Anguet, J. (La Radiotechnique Compelec (RTC), 14 - Caen (France)). 1982. 70p. (In French). European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037.

Work performed under United States-CEA/BMFT Fast Reactor Exchange Program.

A description is given for the study of the fixation of solar cells based on dissipation that correlates with theoretical studies of a thermal model. Also described is the design of prototype model. Comparisons are made between transparent and non-transparent solar panels from both the electrical power and temperature aspects. 5 figures, 8 tables.

33324 **(EUR—8210-FR) New methods for preparing Cu_2S-CdS solar cell semiconductor materials. Final report.** Vedel, J.; LaHaye, J.; Martinuzzi, S.; Bougnot, J. (Montpellier-2 Univ., 34 (France); Universite du Haut-Rhin, Mulhouse (France); Aix-Marseille-3 Univ., 13 - Marseille (France)). 1982. 98p. (In French). European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037.

A description is given for the preparation of Cu_2S films for chemical pulverization, and a study is made of effects that aerosols have on such film. A pilot plant for the manufacture of Cu_2S/CdS solar cells is described, as well as the characteristics of photovoltaic cells. 17 references, 40 figures, 7 tables.

33325 **(EUR—8213-EN/FR) Polycrystalline CdTe thin-film solar cells. Production by triode sputtering and short-distance transmission. Final report.** Marfaing, Y. (Centre National de la Recherche Scientifique, 75 - Paris (France)). 1982. 68p. (In French and English). European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

33326 **(EUR—8305-FR) Deposit of polycrystalline layers of silicon on a conducting substrate, beginning with the liquid phase. Final report.** Belouet, C. (Laboratoires d'Electronique et de Physique Appliquee (LEP), 94 - Limeil-Brevannes (France)). 1983. 85p. (In French). European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

Includes Annexes I and II in English.

It is reported on the results of a one-year study of the growth of polysilicon layers on a carbon substrate by the RAD (Ribbon Against Drop) process. The new pulling equipment, the characteristics of the ribbon substrates and the morphological and electrical properties of the layers are successively described. Deposition lengths up to 80 cm have been achieved at pulling rates 2 to 6 cm/mn on typical substrates (Papyex coated by pyrocarbon deposited at 2000°C). Elastic and thermal properties of the ribbon substrates have been investigated and a preliminary study of the strains in the multilayer Si-substrate is presented. The anisotropy of the reactivity of pyrocarbon with molten silicon is evidenced. Then follows a theoretical and experimental evaluation of the electrical properties of the layers using the results of their morphological studies. Finally, the feasability of Si-substrates ohmic contacts is demonstrated. On the basis of all the results accumulated, it is concluded that AM1 conversion efficiencies of 10% can be achieved for n+/p homojunction cells.

33327 **(IVL-B—668) Biogas in China 1981 - a travel report.** Frostell, B.; Norrman, J. (Institutet foer Vatten- och Luftvaardsforskning, Stockholm (Sweden)). Mar 1982. 57p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750516.

Portions are illegible in microfiche products.

Biogas is formed by anaerobic fermentation of organic material. In China there are about seven million biogas units of family size distributed all over the country. Biogas is produced from manure,feces, domestic wastes and straw. The gas is used above all for cooking and lighting in the homes. Other advantages with biogas are that wood-firing has declined drastically, the forest is saved, the state of health in the villages has improved (the drinking water is boiled) and the out-put from the biogasplants is an excellent medium for plant nourishment and soil benefaction. The main reasons for the fast advancement of biogas technology in China compared with other countries are:- The benefits of the biogas technology have been viewed from a broad perspective. - Great resources have been allocated to the development of the biogas technology. - An effective organisation for dissemination of biogas technology has been formed. - Simple and inexpensive units have been developed. A conclusion from the visit is that Sweden has much to learn from the Chinese biogas programme. Not so much concerning technology development, but rather about the dissemination of the biogas technology.

33328 **(JTI—38) Technical equipment for the cultivation of energy forest.** Noren, O.; Danfors, B.; Stambeck, A.; Gutekunst, K. (Jordbrukstekniska Inst., Uppsala (Sweden)). 1982. 116p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750545.

Portions are illegible in microfiche products.

This report starts with a description of studies of the literature and contacts with institutes and people engaged in different projects. A short description is then given as regards requirements on soil types, shapes of fields, etc. The off-road mobility of machinery and vehicles in this connection is of exeptionally great importance both during summer and winter. Snow conditions in Sweden (depth, density and mass) have been studied in detail. The different work operations and equipment required in connection with planting, management and harvest of energy forests are discussed in chronological order. Examples of operations where special inputs will be required to develop techniques and equipment are planting of cuttings and weed control in new and growing stands. The efficiency of machinery and vehicles on access roads as well as off-road mobility is treated here and is considered to be one of the major problems. Off-road mobility and risk of damage to the soil surface will require development of, in some cases, advanced wheel or track equipment. The harvesting of energy forests has been surveyed for the sake of completeness. The handling, drying and stor-

age of the harvest have been discussed and some proposals made on the direction of future developmental work. The planting, management and harvest of energy forests requires a certain amount of service and requirements in the form of, e.g., fuel, spare parts and equipment for hauling or winching out bogged-down machinery. The report ends with a tabular summary comprising the following headings: work operations etc.- specification of requirements - existing systems, machinery or machinery parts - usability - need of basic data - need of development. In general it is observed that available technique and equipment can easily be adapted for some work operations in energy forestry.

33329 **(LUTKDH/TKMB—1002/150(1981)) Methane fermentations. End product inhibition, thermophilic methane formation and production of methane from algae.** Hansson, G. (Lund Univ. (Sweden). Dept. of Technical Microbiology). Oct 1981. 154p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750457.

Portions are illegible in microfiche products.

End product inhibition in methane on glucose and fatty acid substrates was studied in batch fermentations with enrichment cultures. Effects of pCO_2 and pCH_4 on kinetics and yields were determined. Propionate/butyrate oxidation by acetogens were the slowest steps while CH_4-production from acetate was 3-10 times faster. CO_2 inhibited acetate and propionate degradation; rates were 4 times faster at low pCO_2 compared to 1 atm CO_2. Butyrate degradation was not much affected. pCO_2 affected methane yields with 20-30 per cent lower yields in 1 atm CO_2 compared to low pCO_2. To obtain optimum rates and yields fermentations should be carried out at around 0.2 atm CO_2. CH_4 was not significantly inihibitory. Thermophilic methane fermentation. Adaption of mesophilic cultures to thermophilic conditions proceeded rapidly suggesting that some mesophiles may switch to thermophilic conditions rather than there is a special thermophilic flora. pCO_2 caused the same degree of inhibition as in mesophilic cultures. Temperature maximum for acetate degradation was around 65 degrees C at high pCO_2 but considerably higher at low pCO_2 suggesting CO_2-effects on cell membranes. In N_2-environment methane production from glucose was possible at temperatures up to 85 degrees C. Methane production from marine, green macro-algae was studied in semi-continuous fermentations, started with a mixed inoculum from sediments, sewage sludge, rumen contents etc. Ground algae without any additions were used as substrate. Retention times down to 12 days were suitable. Gas yields were 250-350 ml CH_4/g VS added and the VS-reduction 50-55 per cent. No advantages were found with a thermophilic process.

33330 **(N—8231443) Effects of processing and dopant on radiation damage removal in silicon solar cells.** Weinberg, I.; Brandhorst, H.W., Jr.; Swartz, C.K.; Mehta, S. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1982. 15p. (NASA-TM—82892; E—1270). NTIS, PC A02/MF A01.

Gallium and boron doped silicon solar cells, processed by ion-implantation followed by either laser or furnace anneal were irradiated by 1 MeV electrons and their post-irradiation recovery by thermal annealing determined. During the post-irradiation anneal, gallium-doped cells prepared by both processes recovered more rapidly and exhibited none of the severe reverse annealing observed for similarly processed 2 ohm-cm boron doped cells. Ion-implanted furnace annealed 0.1 ohm-cm boron doped cells exhibited the lowest post-irradiation annealing temperatures (200 C) after irradiation to 5 x 10 to the 13th e(-)/sq cm. The drastically lowered recovery temperature is attributed to the reduced oxygen and carbon content of the 0.1 ohm-cm cells. Analysis based on defect properties and annealing kinetics indicates that further reduction in annealing temperature should be attainable with further reduction in the silicon's carbon and/or divacancy content after irradiation.

33331 **(NE-BF—81-2) Thermal cracking of tars and hydrocarbons by adding oxygen and steam.** Joensson, O. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jun 1981. 34p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750485.

Portions are illegible in microfiche products.

The production of synthetic gases by the gasification of biomass implies unwanted components in the gas such as tars and other lower hydrocarbons. In order to remove these components thermal cracking has been investigated experimentally. It was shown that the tars can in a fairly easy way be converted into non-condensable products. Temperatures higher than 1250 degrees C and settling times longer than 8 sec. are required for the satisfactory conversion of methane.

33332 **(NE-BF—81-6) Bioconversion of cellulose to liquid fuel (ethanol) and energy related chemicals.** Hahn-Haegerdal, B.; Mattiasson, B. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Apr 1981. 113p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750460.

Portions are illegible in microfiche products.

This report deals with cellulose degradation with special emphasis on enzymatic hydrolysis, fermentation of cellulose hydrolysates such as hexoses and pentoses to ethanol and energyrelated chemicals as well as a description of the by-product pattern involved in the various fermentation routes. Cellulose degrading, glucose and xylose fermentingmicroorganisms are described. Conversion techniques such as continuous fermentations, fermentations with cell recycle, enzymatic conversions in membrane reactors as well as extractive conversions have been dealt with. Up-grading techniques such as reverse osmosis, extractions in hydrophobic as well as aqueous have been studied. Destillation techniques such as azeotropic and extractive destillation are described in order to identify low energy processes for the final product up-grading. For regulation and control of conversion and up-grading processes specific methods for analysis of substrate (raw material), intermediary products and products have been identified. In order to find energetically favourable conversion processes a couple of alternatives for integration of conversion and up-grading techniques have been considered. Mainly extraction and membrane technology has been used. With the intention to improve energy balance in such integrated processes specific biological sensors have been used to control and regulate substrate and product flow. Energy savings in the final destillation step have been estimated for ethanol and butanol preconcentrated by either extraction or membrane technology.

33333 **(NE-EO—81-14) Insect damage to fast growing Salix and Populus species.** Uteberg, E.; Olsson, H. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1978. 107p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750526.

Portions are illegible in microfiche products.

A special study project was initiated at two sites in Central Sweden to investigate insect damage to shoots, leaves and/or buds in short term rotation forestry stands (energy forests). Several insect species were observed to be causing measureable damage, particularly Rhabdophaga terminalis and Melasoma populi. Methods for estimating insect population changes over one or several growing seasons were also developed.

33334 **(NE-EO—81-15) Wood properties of salix caprea and salix pentandra.** Sennerby, L. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1979. 80p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750522.

Salix caprea and Salix pentandra have been investigated with regard to the qualities and the anatomy of wood in these species. For example the type and distribution of cells, cellwallthickness, cell diameter and differences between early and late wood cells in one annual ring have been studied. The specific gravity was determined through measuring the oven dry weight and the green volume of the samples and is given in kg/m³. The investigated material shows that S.caprea in general has a higher specific gravity, 480 kg/m³, than S.pentandra, 440 kg/m³. The specific gravity in both species increases from the stump to the middle and thereafter decreases towards the top of the tree. The moisture quotient of the wood has its highest values in the stump, and decreases towards the top of the tree. The moisture quotient is higher in S.pentandra than in S.caprea. Bark percentage by weight increases towards the crown. One-year-old sprouts of S.caprea, S.viminalis, S.fragilis and S.smithiana have been investigated with regard to specific gravity, moisture content, bark percentage and the constitution of vessel members and fibres.

33335 (NE-EO—82-2) Reed harvesting Koeping. Karlsson, O.; Andersson, L. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). May 1981. 61p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750531.

Portions are illegible in microfiche products.

This project has in view to test if common farming machines can be used for reed harvesting on ice and how efficient they are. Our method was to harvest reed on ice and transport it to a terminal on land. The water depth in the reed belt is 0-2 meter. 0.4 - 0.45 m is demand for the harvesting machinery. The safety margin is then 100 per cent. Some different farming machines were tested, which gave the results as follows. A common moving machine is unsuitable because it lays down the reed in a compact, hardcatched swath. The trials with conventional chop harvesters showed that they functioned badly in reed. A precision-chop harvester, which picked up the swath of reed from the ice worked very well. Two small balers, a medium press and a hard press, worked well in the trials when they were droven carefully in swath-laid reed. Three different types of balers of big balers were tested. Of the two roundbalers the one with fix-chamber worked very well. In the fix-chamber press we used, the bale was formed by the sheet metal drums which surround the bale-room. The harvest capacity in reed was very high. This is true also for the third press which produced square, easily transportable bales. but the density of these bales was only half of that of the round-bales. An older precision chop harvester with fingerbar and swath board worked very well in the reed because of its rough construction. The water content of the harvested reed was around 15 per cent and the harvest time February and March 1981. The cost for harvest, transport to a terminal and loading on a lorry for road-transport, is about 0.15- 0.16 Skr per kg reed in big bales and some more for reed chaff. Our suggestion is to build a special machine for straw and reed harvest. The basic construction can be a combine in which the treshing parts are changed to a big baler. The tires should give a very low ground pressure and the machine should float.

33336 (NE-EO—82-4) Energy forestry in the north of Sweden. Eriksson, S.; Hedman, G.; Skaerbaeck, E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Feb 1982. 62p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750525.

Portions are illegible in microfiche products.

The preconditiones for large-scale practical cultivation trials in connection with energy forests in the north of Sweden have been studied. Extensive forms of cultivation may be more advantageous economically than intensive methods under the prevailing conditions. Naturally excisting deciduous species and selected species of alder, aspen, birch or sallow should be used. The largest areas of terrain available for energy forest cultivation consist of marshland, approximately 1.3 million hectares. The large scale trials at present under consideration comprise cultivation on both marshland and abandoned agricultural land, the later being well-located and requiring little preparation for cultivation. Two areas of land in the vicinity of Vaennaes have been selected for trials both extensive and intensive cultivation, the total area being 300 ha. Several organisations have been contacted to discuss the implementation of the scheme. An outline of time schedule covers a period of 16 years. The cost of the first two phases, up and to and including 1987 have been estimated to amount to approximately 9 million SEK.

33337 (NE-EO—82-5) Energy Reeds. Part 4. Granelli, W.; Enell, M.; Unosson, L. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Feb 1982. 162p. (In Swedish). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750530.

Portions are illegible in microfiche products.

The overall objective of the project is to investigate whether reed (Phragmites australis) can be utilized as a source of energy in Sweden. The water content and chemical composition, including plant nutrients, sulphur and heavy metals, of reed has been investigated. Fertilization experiments have been conducted in four natural reed stands. Natural reed stands were, for experimental purposes, harvested during the winter. In greenhouse experiments regeneration of severed reed shots and rhizomes was investigated. Small scale reed plantation experiments were started in 1979. At the end of 1980 growing season fertile shots were found and the maximal shoot density was about 70 m_2. Available reed harvest technology has been evaluated. Harvest experiments with agricultural equipment showed that this method is economically feasible once the ice is more then 25 cm thick. Development of amphibious energy reed harvesters is under way. Reed culms have been cut to chips and compressed to pellets, and brickets. Reed can be burned in the same way as straw i.e. baled.

33338 (NE-SBT—81-7) Joint IEA/IUFRO forestry energy workshop. Mattsson, J.E.; Nilsson, P.O. (eds.) (Swedish university of agricultural sciences, Garpenberg (Sweden). Department of operational efficiency). (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). May 1981. 140p. (CONF-8010301—). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750547.

From Joint IEA/IUFRO forestry energy workshop; Garpenberg, Sweden (2 Oct 1980).

Portions are illegible in microfiche products.

The International Forestry Energy Meeting in Sweden 1980 included three parts. The proceedings from the Workshop are published in this report. National programs and projects on harvesting and utilization of forest biomass for energy purposes are reviewed in 12 papers.

33339 (NE-SBT—81-9) Harvesting and utilization of wood for energy purposes. Mattson, J.E.; Nilsson, P.O. (eds.). (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1981. 254p. (CONF-8009279—). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83750546.

From International conference on harvesting and utilization of wood for energy purposes; Elmia, Joenkoeping, Sweden (29 Sep 1980).

Portions are illegible in microfiche products.

The International Forestry Energy Meeting in Sweden 1980 included three parts. The proceedings from the Conference and from the IEA/IUFRO Workshop are published in two separate reports. In this report the conditions, problems and methods for energy purposes are discussed. .

33340 (NE-SBT—81-17) Storing of stump wood in a simulated environment. Nylinder, M.; Thoernqvist, T. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1981. 49p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750517.

Portions are illegible in microfiche products.

For the past 5 years stump and root wood have been utilized in Sweden for industrial production of pulp chips. The purpose of this study is to illustrate the changes which occur in root wood moisture content and dry basic density during storage. The study is comprised of eight trials, of which four trials were with spruce and four with pine stumps. Repeated weighings were done during the year in order to determine the drying and moisture adsorption rates during the year. The average moisture content value for the eight trials at the end of the study was between 21.9-26.5 per cent. The stump wood moisture content as the start of the study was approximately 50 per cent. During the first two months (September-October) of storage the moisture content sank to approximately 35 per cent. The following summer's drying resulted in a reduction in moisture content to approximately 20 per cent. During the fall moisture was reabsorbed, increasing the level several percent points. The average value of the spruce stumps dry basic density at the end of the storage period varied between 436-485 kg/m^3 solid for the different trials. Corresponding average values for the pine stumps was somewhat lower and varied between 410-433 kg/m^3 solid. The stumps weight reduction was during the first two months after removal, at 20-25 per cent. The following summer, the weight reduced an additional approximate 10 per cent. The lowest weight, relative to initial weight, was 65 per cent. This was registered during July-September.

33341 (NE-SBT—81-19) Scaling of fuelwood and fuelchips. Nylinder, M. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1981. 59p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750528.

Portions are illegible in microfiche products.

The aim of the work is to study problems as regards measuring and evaluation of fuelwood and fuelchips. The aim is also to give general information about dimensions and distribution of species etc. for fuelwood and woodchips. The following variables in stated order give most information when determining the energy value of fuelwood. 1. The weight of the load 2. The solid volume of the load 3. the stacked volume of the load The accuracy in determination of the energy value will not be much improved if the moisture content also is determined. Five different sampling methods have been tested for determination of moisture content. The result indicates that quite simple methods can be developed for determination of density and moisture content. In comparison with weighing without moisture determination, volume determination in solid as well as stacked units seems to be a more advantageous method.

33342 (NE-SBT—81-25) Wood qualities and measurement of whole tree. Nylinder, P. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1979. 36p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750527.

Portions are illegible in microfiche products.

The shortage of wood raw material in Sweden has brought up the question of increasing the base of raw material by utilizing a bigger part of the trees. The present report is analysing the wood quality etc. of whole tree, cut in maximum length of 5.5 m, from first thinning. The trees (pine, spruce and birch in assortments) have been transported by lorry to a sulphate pulp mill in Vaermland, in western Sweden, where they have been closer examined. Green density and basic density of the stem wood and of the branch wood have been studied as well as the percentage of bark of the stems. Further, a method of measuring the cut, untrimmed trees has been worked out.

33343 (NE-SBT—81-38) Rationalization conference, 1981. Logging research foundation. Nilsson, P.O. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Feb 1981. 106p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750461.

Portions are illegible in microfiche products.

The conference dealt with the following topics: BACKGROUND How we coped during the seventies. New technology in the forest. STAND ESTABLISHMENT Methods of stand establishment during the late seventies and forecasts for the eighties. New lines of development needed in planting. Developments in site preparation. Manual planting could be more efficient. Mechanical artificial regeneration - solutions in sight. STAND TREATMENT Cleaning and thinning methods during the late seventies and forecasts for the eighties. What to do about the cleaning requirement. Thinning work can be more efficient. Felling patterns in partially mechanized thinnings. Felling and yarding - the stumbling blocks in thinning. Three sections: a profitable thinning alternative. HARVESTING Final-felling methods during the late seventies and forecasts for the eighties. Improved methods of bucking to benefit the forest and the mill. Harvesters today and tomorrow. The utilization of logging residue. New stump-harvesting techniques. GLIMPSES OF THE FUTURE Future techniques on forestry. Forest management in the eighties - a flexible organization. Trends affecting future logging systems.

33344 (NE-SBT—82-1) Logging residue as fuelwood in forest farmers houses. Mattson, J.E.; Sundstedt, E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1977. 91p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750524.

Portions are illegible in microfiche products.

Rising oil prices have increased the interest in wood firing. Many forest farmers will find it profitable to use wood fuel from their own forest. A large part of the logging costs is the cost of the farmers labour. The value of this labour is no longer subject of income tax, according to a new Swedish law. The advantages of wood chips compared to fuel oil are: - the use of a domestic renewable fuel. - fuel supply all over the country. - relatively low cost. - less air pollution. Disadvantages of wood chip firing are: - wood chips require more storage space. - need of regular attention. - higher cost for firing equipment. Firing wood chips is generally done in one of two ways. The most common way is to burn it in a special burner just outside the existing stove. This type of equipment allows a moisture content of 30-60 per cent. The other type of equipment, the stoker, which slowly feeds chips into the existing stove, requires a moisture content less than 30 per cent. When switching from fuel oil to wood chips a number of factors must be considered such as price, fuel consumption, fuel oil price, annual consumption of chips, chip storage cost, cost for attention and initial equipment cost. Each year some 50 million m^3 of logging residue are left on the ground in swedish forests. On one hectare of thinning or clearcut some 20 solid m^3 of logging residue is left, available for firing. The chippers that are on the market today may be improved in many respects. That is especially true for the operator working position and the infeed.

33345 (NE-SBT—82-3) Distribution of organic matter, carbon and plant nutrients in soil in the early phase after clearcutting of a scots pine forest; with and without removal of logging slash. Staaf, H.; Berg, B. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1980. 44p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750523.

Portions are illegible in microfiche products.

The amount of organic matter and soil nutrients in different soil horizons following clear-cutting of a Scots pine forest were determined during a fouryear period. Measurements were made after 1 1/2 and 3 1/2 years on plots where all slash was removed and on such with double the normal amount of slash. As a consequence of slash removal the decomposition of the mor layer increased significantly, thus giving lower amounts of organic matter and plant nutrients both in the litter and humus layers at 3 1/2 years after clearcutting of either slash removal or the clear-cutting as such.

33346 (NE-SBT—82-16) Drying of fuel chips with solar panel warmed air. Thoernqvist, Th. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 64p. (In Swedish). (SLU-IVL—126). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750543.

The purpose of this investigation was to study the effect of artificial drying on stored fuel chips. The drying was done with air which was heated with solar panels during an 8-day period. The drying fan was in operation 13-15 hours per day. After drying the fuel chips were stored 15 weeks in a machine shed. The moisture content in the fresh material was 50.7 per cent. After 8 days drying the moisture content had sunk to an average of 7.5 per cent, but then increased to 10.9 per cent during the following 15 weeks storage. The dry matter losses were 1.8 per cent during drying, and 1.2 per cent during the storage period, for a total wood loss of 3 per cent. At an oil price of SEK 2000 per ton the value of raw aspen chips is approximately SEK 137/m^3s. The value increases with drying to about SEK 19/m^3s to SEK 156/m^3s, if no considerations is taken to the drying cost or capital invest in the dryer. (s=stacked). After 15 weeks storage the value sank to SEK 152/m^3s while the value of undried sank to SEK 123/m^3s, which means a differance of SEK 29/m^3s. The differance between SEK 29- and 19/m^3s depends to a large degree on the fact that the matter loss in undried fuel chips, which was stored outdoors, can amount to 3 per cent per month. The total amount of fungus diaspores in the fresh material was $8x10^9$ per kg DM, while the amount of germinating diaspores was $7x10^6$ per kg DM. During drying the amount of germinating diaspores increased to $8x10^7$ per kg DM, while the overall amount remained unchanged. After storage the amount of germinating diaspores was calculated to be $1x10^8$ per kg DM while the overall diaspore count was $2x10^{10}$ per kg DM (dry matter).

33347 (NE-SBT—82-18) Importance of cover and air under-base with storage of fuel chip chips. Thoernqvist, T. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 93p. (In Swedish). (SLU-IVL—127). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750537.

Portions are illegible in microfiche products.

The purpose of this investigation has been to study moisture content changes, matter losses, and fungus diaspore amounts in outdoor storage of fuel chip piles. Fresh harvesting residuals (logging slash) were chipped and laid up in 4 piles. The pile height was 3 m

and the base diameter 7 m. Two of the piles were placed on expanded metal about 30 cm above an asphalt surface the remaining two piles were placed directly on the asphalt surface . Above one of the piles on the expanded metal and above one on the asphalt, an air-filled covered space was provided, covered by a tarpaulin. The moisture content in the fresh material was 54.8 per cent. Common to all 4 piles was a build up of moist and a dry area, between whi ch was a sharply defined boundary. The moisture content in the moist areas varies between 50-70 per cent, and in the dry areas between 17-23 per cent. The largest material losses occur in the other moisture areas, where up to 24 per cent loss was registered during the storage time. In the central dryer and warmer parts of the piles the matter losses was lower. High concentrations of fungus diaspores in the air can cause allergic reactions among persons who work with, or are present in locals where fuel chips are handled. In the fresh chips there was a total of 8×10^9 fungus diaspores per kg DM (dry matter). Of these 9×10^6 were live, that is, germinated on malt agar at 40 degrees C and at room temperature. During the storage period the total diaspores increased 10 - 100 times . The germinating fungus diaspores increased at a rate of 5 - 20 000 times (5×10^7 - 2×10^{11}). The result shows that it is of considerable significance that fuel chip storage be provided with an air-filled covered space.

33348 **(NP—3750446) How much is a biogas system to cost. Operational evaluation of biogas in agriculture.** Parsby, M. (Jordbrugsoekonomisk Inst., Copenhagen (Denmark)). 1982. 49p. (In Danish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750446.

Portions are illegible in microfiche products.

In 1978 a project was started to adopt and develop a biogas technology, based on animal manure, suitable for Danish farming. The project is performed by the STUB-group (The Project Group for Development of Biogas Technology) and financed by the Ministry of Energy. In this report the economics of biogas production has been analysed and evaluated. By capitalization of expected net income, the maximum permissible capital investment in a biogas plant is estimated, i.e., how much the farmer can pay for the plant without loss of profitability. Sensitivity analyses are carried out. This is necessitated partly by the unknown future energy price trend, interest level and inflation partly by uncertainty on the technical economic parameters. Finally, the economic consequences of possible environmental improvements are discussed. In table 1 the maximum permissible price of a $100 m^3$ continous fed biogas plant for heat production is shown for different retention time and gas production. If the manure carried to the plant has an average retention time of 20 days in the reactor and it is possible to obtain a biogas production of 0.4 m^3/kg V.S. added, the maximum initial investment will be about 190 000 dkr. Installation of biogas plants in agriculture will most often be based on partial private energy utilization. Thereby is obtained an advantage, the capitalized value of which should be added to the previously calculated maximum permissible investment. Depending on the amount and proportion of the private energy utilization the addition amounts to 25-50 000 dkr. Further, biogas technology offers some possible environmental advantages which, however, can be difficult to cope with in economic calculations. Good environmental effects are not (at present) obtainable with the relatively short retention times and the continous fed reactor considered in this report. "Maximum" environmental solutions means "minimum" energy solutions.

33349 **(NP—3750447) Fuel ethanol from agricultural crops. A review.** (Novo Industri A/S, Bagsvaerd (Denmark)). Nov 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750447.

For oil-importing countries with surplus capacity for production of agricultural crops, the conversion of sugar or starch containing biomass to ethanol for fuel use appears to be a sensible supplement to other ways of reducing the strain on trade balance caused by the steadily increasing price on crude oil. The much debated objections to the fuel alcohol concept - its bad effect on the global nutrition situation, its negative energy balance and poor economy - all seem to weaken considerably when investigated in more details. In most cases, however, due to production capacity limitations, only a very modest part of a country's motor fuel demand can be covered by alcohol from biomass. Also, until further crude oil price increases have taken place, some sort of government support will be necessary for the profitability of fuel alcohol production. In a more distant future, both of these limitations may disappear when appropriate technology has been developed for production of alcohol from the vast quantities of cellulose contained in agricultural, forestry and municipal waste.

33350 **(NP—3750481) Workplan for an analysis of the fuelwood cycle in Kenya and the feasiility of expanded fuelwood production.** (Vetenskapsakademin, Stockholm (Sweden). Beijerinstitutet). [nd]. 26p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750481.

Portions are illegible in microfiche products.

The proposed project will design the basic program for an expansion of the wood supply in Kenya. Factors such as cite capability,species selection, husbandry regimes, and socio-economic considerations underlying decisions by rural households to participate in a major wood production effort as well as total environmental impacts of expanded wood growing are embraced. The total cost of the project is estimated at 1,475,540 dollars.

33351 **(NP—3750482) Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane.** Hoeglund, C. (Vetenskapsakademin, Stockholm (Sweden). Beijerinstitutet). Aug 1981. 58p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750482.

Portions are illegible in microfiche products.

This paper reports on results from a series of tests with four different types of agricultural residues as fuel for producer gas generation. The fuels are coconut shells, coconut husks, pelletized wheat straw and pressed sugar cane. The tests were made with a 73 Hp agricultural tractor diesel engine equipped with a standard gasifier developed for wood chips in Sweden, and run on a testbed at the Swedish National Machinery Testing Institute. The engine was operated on approximately 10 per cent diesel oil and 90 per cent producer gas. The gas composition, its calorific value and temperature, the pressure drop and the engine power were monitored. Detailed elementary analysis of the fuel and gas were carried out. Observations were also made regarding the important aspects of bridging and slagging in the gasifier. The tests confirmed that coconut shells make an excellent fuel for producer gas generation. After 8 hours of running no problems with slags and bridging were experienced. Coconut husks showed no bridging but some slag formation. The gasifier operated satisfactorily for this fuel. Pelletized wheat straw and pressed sugar cane appeared unsuitable as fuel in the unmodified test gasifier (Type F 300) due to slag formation. It is important to note, however, that the present results are not optimal for any of the fuel used, the gasifier being designed for wood-chips and not for the test-fuels used. Tests using appropriately modified gasifiers are planned for the future.

33352 **(NYSERDA—82-30) Thinning woodland with small tractors for fuelwood and forestry.** (Wood for Fuel Project, Inc., New Paltz, NY (USA)). Jun 1982. 140p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

Small-tractor-based harvest operations, which have been used in Europe for many years, are needed now in this country. The purpose of this report is to strengthen the possibility that small fuelwood businesses using small logging tractors will be created and will grow. The results of field tests of four small logging tractors are reported. The economics of each tractor is evaluated, and methods and costs involved in gaining long-term access to fuel-grade supplies are considered. Environmental impact and strategies for managing privately-owned woodland are also discussed. Available resources and existing technical assistance vital to the success of small-tractor-based fuelwood businesses are identified.

33353 (ORNL—5999, pp 48-63) **Biomass.** Van Hook, R.I. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The current efforts of Environmental Science Division (ESD) in the field of biomass focus on the production of woody biomass for energy and on the environmental consequences of the

intensive production and harvesting of that biomass. ESD manages two research programs, the Short-Rotation Woody Crops Program (SRWCP) and the Environmental Effects of Whole-Tree Harvesting Program, for the Biomass Energy Technology Division of the US DOE. Management of these programs includes subcontract procurement, program synthesis, and in-house research efforts in support of the SRWCP and the Whole-Tree Harvesting Program. These research efforts include nutrient studies of intensive forest management and economic analyses of biomass production. In addition, ESD performs related research for the DOE's Division of Carbon Dioxide Research and its Office of Basic Energy Research.

33354 (SERI/TP—234-1816) Open-loop transport of solar energy using natural-gas networks. Nix, R.G. (Solar Energy Research Inst., Golden, CO (USA)). Apr 1983. Contract AC02-77CH00178. 8p. (CONF-830622—6). NTIS, PC A02/MF A01. Order Number DE83009104.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

This paper examines the feasibility of transporting solar energy via a thermochemical-energy process and natural-gas networks. The high-temperature solar energy from a central receiver is converted to chemical-bond energy by steam reforming of natural gas to synthesis gas: HEAT + CH_4 + H_2O → CO + $3H_2$. The synthesis gas is dehydrated and transported in the natural-gas pipeline. At the user end, the synthesis gas is methanated to produce synthetic natural gas (SNG) and to release the stored energy: CO + $3H_2$ → CH_4 + H_2O + HEAT. The recovered heat is used in an industrial park to produce 944 GJ/h (895 MBtu/h) of 4.14 MPa (600 psig), and 400°C (750°F) superheated steam which is piped to 10 equal-sized user facilities clustered in the industrial park. The SNG is distributed to natural-gas users. Two cases were examined - a new pipeline and an existing pipeline. The new pipeline must be 76 cm (30 in.) in diameter to carry the same fuel-gas energy using synthesis gas as is carried in a 51-cm (20-in.) natural-gas line. The synthesis gas system is more efficient than molten-draw-salt energy transport for transport distances greater than about 50 km (30 miles). The solar system with transport is cost-effective compared with residual-oil or natural-gas-fired boilers. In the second case, an existing 76-cm line, pipeline operations both at capacity and at half-capacity with natural-gas transmission were considered. For an existing line operating near capacity, there is a negative incentive to carry solar energy via synthesis gas, because the total energy flow decreases significantly relative to natural gas. If the existing line is operating at half-capacity or less prior to conversion, there is then an incentive to transport solar energy via synthesis gas. This case, then, becomes more cost-effective than a new pipeline.

33355 (SLU-ISS—2-1980) Biomass of Scots pine (Pinus Sylvestris L.). Amount-development-methods for mensuration. Albrektsson, A. (Sveriges Lantbruksuniversitet, Umeaa. Inst. foer Skogstaxering). Nov 1980. 189p. (In Swedish). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750542.

Portions are illegible in microfiche products.

The dry weight and dimension of tree biomass fractions in Scots pine stands of different ages are analysed. The analyses include 21 sites and 289 sample trees and show: - descriptions of biomass in investigated stands. The increase in standing crops of stems, stumps and coarse roots (>3cm) during the phase of net increase of the stand is indicated. The biomass of branches and needles early reached almost constant levels. - analysis of production. There are relationship between tree height and diameter and the allocation of production. Increasing tree height directs production from needles and branches towards stem, stump and coarse roots. Increase in tree diameter tends to have the opposite effect. - functions for non-destructive measurement of dru weight of fractions. As independent variables tree height, tree diameter, thichness of bark, mean annual ring widht and current stem volume growth are used.

33356 (USDA-FS-RP-NC—200) Harvesting wood for energy. Arola, R.A.; Miyata, E.S. (North Central Forest Experiment Station, St. Paul, MN (USA)). 1981. 28p. North Central Forest Experiment Station, USDA - 1992 Folwell Ave., St. Paul, MN 55108.

The objective of this paper is to present pertinent cost and productivity data for several wood harvesting operations. These operations were not all conducted to provide wood fuel, but the information is still of value to those considering the harvest of wood for energy. The case studies are based on the following harvesting operations: Two mechanized thinning operations in pole-sized hardwoods. One hardwood land-clearing operation (for agricultural land). One hardwood land-clearing operation (for site conversion). One relogging operation of hardwood tops and limbs resulting from a saw log harvest. All of the studies were conducted between 1974 and 1978. Information on the costs and productivity of commercial logging equipment is included.

33357 (VTT-TIED—107) Drying of peat and wood biomass. Literature review. Tapanainen, J. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland). Poltto- ja Voiteluainelaboratorio). (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Jun 1982. 44p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).

Peat drying agrees with the typical drying curve of capillary porous materials, where a constant rate zone and a zone of decreasing rate of drying are distinguished. It depends on the way of water binding, how easily the moisure of pea can be removed. Wood is a hygroscopic porous material, and its drying can be described with the aid of diffusion theory. Milled peat is usually dried artificially in flash driers. Drum driers are also used for peat to some extent. The best known indirectly heated equipment is Peco-drier, where saturated steam and hot water are used as heat transfer media. A back-pressure drier developed in Sweden is also suitable for peat drying. In this equipment, indirect drying with back-pressure steam from the turbine is applied. Wood biomass (chips, bark) can be dried for example by hot-grinding, vibrating conveyor or drum drying methods. Cascade and pneumatic driers are also used for drying bark.

33358 (VTT-TUTK—108) Utilization and processing of forest energy. Part 6. Properties and grinding of fast growing wood. Aeijaelae, M. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Jul 1982. 46p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).

An alternative of producing energy in the future is to cultivate fast growing tree species for energy production. This alternative may not play any important role in Finland's energy supply until in the 1990s. In the present research activities cultivation methods are being studied and culture species and clones are being selected. To facilitate the selection, properties of different species have been analysed. The results of these analyses and those of willow and forest waste grinding experiments are presented. The dry-green densities of different willow species varied from 250 to 440 kg of dry matter/m^3. The density increases clearly with the ageing of the willow, and the densities of wild species are higher than those of the fast growing cultivated species. The densities of poplar species varied from 320 to 410 kg of dry matter/m^3, and the effect of age was similar to willows. The density of birch was considerably higher than that of the other analyzed tree species and varied from 440 to 470 kg of dry matter/m^3. The variation in ash content was widest for willows and smallest for birches. Fertilization may have a strong effect on the ash content. The applied fertilizers had an effect on the softening point of ash. It varied from 1095 to 1380 deg C for different samples. The melting point was not reached with the available equipment, although the temperature approached 1500 deg C. The result can be considered fairly exceptional compared to other fuels. When dry willow chips were ground to the size required by pelletization, the consumption of energy varied from 0.05 to 0.10% of the calorific value of chips dry matter. The corresponding value of forest waste was 0.2-0.3%. Earlier tests with birch chips resulted in values from 0.2 to 2.0%. The values are affected by the moisture content of chips and by the fineness degree of grinding.

33359 Studies of grain boundaries in small-grained polycrystalline silicon solar cells. Young, R.T. (Oak Ridge National Lab., TN); van der Leeden, G.A.; Wood, R.F.; Narayan, J. *Conference Record of the IEEE (Institute of Electrical and Electronics Engineers) Photovoltaic Specialists Conference;* 427-430(Sep 1982). Contract W-7405-ENG-26.

Progress in the development of small-grained (10 to 100 μm) polycrystalline Si solar cells is hampered by the present poor

knowledge of physical and chemical properties of grain boundaries and the lack of satisfactory processing techniques for junction formation. In the work discussed in this paper we have studied grain boundaries and their effects in polycrystalline silicon with grain sizes of 1 to 2 mm and in smaller grained material with grain sizes of 10 μm and 40 to 50 μm. Results for various recombination effects obeerved in the large-grained material are described and the influence of lithium passivation on the electrical properties of the small-grained material and on the characteristics of solar cells made from it are reported.

33360 **Effects of size and growth rate on vegetative reproduction in Typha.** Grace, J.B.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Oecologia;* **50**: 158-161(1981). Contract AC02-76EV01599.

The objective of this study was to separate the effects of plant biomass and growth rate on vegetative reproduction in two species of cat-tail, Typha latifolia and T. angustifolia. Replicate clones of both species were grown under conditions of 100%, 42%, 24%, and 9% full sunlight with harvests at 41, 70, and 91 days after shading. T. angustifolia produced most of its vegetative offspring before the first harvest and increased biomass over the remainder of the experiment by increasing the size of its ramets. In contrast, T. latifolia produced vegetative offspring gradually throughout the experiment adding new ramets only after existing clones were of mature size. As a result of these differences in the cloning process, T. angustifolia showed little correlation between vegetative reproduction and clone size while T. latifolia showed a strong correlation between vegetative reproduction and clone size at the three highest light intensities. Growth rates, average clone size and vegetative reproduction were all reduced by reductions in light intensity for both species. However, no effect of growth rate on the relationship between clone size and vegetative reproduction in T. latifolia could be detected. T. latifolia showed greater survivorship and more biomass production under 9% light than T. angustifolia indicating a greater shade tolerance.

1406 Photovoltaic Power Systems

REFER ALSO TO CITATION(S) 33519, 33784

33361 **(EUR—8204-FR) Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report.** Aubert, B. (Seri Renault Engineering, Bois d'Arcy (France)). 1982. 51p. (In French). European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037.

A design and feasibility study is made for the constrution of a number of photovoltaic generators with a peak pulse power of 5 kW, and an evaluation is made of the photovoltaic panels. Illustrations of the solar energy collectors and site equipment are presented as well as tabular data on solar battery function, generator circuitry, and performance results.

33362 **(EUR—8328-EN) System analysis of the interconnection of 5-kW solar panels with the power lines. Final report.** Vanwormhoudt, M.C.; Baert, D.H.J.; Van Hoogenbemt, G.H.; Bonte, L.; Allais, L. (Ghent Rijksuniversiteit (Belgium). Lab. voor Elektronica en Meettechniek). 1983. 127p. European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

The purpose of the work carried out in this project was to develop dc-ac inverter circuits which can be used for the connection of solar panels with the power grid. The difficulties occurring when photovoltaic (p.v.) generators and electronic inverters are cascaded had to be evaluated. It had also to be investigated by which control circuits the inverters can be driven in order to operate the p.v. generator at its maximum power point. The first circuit designed in the study was a 800-Watt solar panel simulater which permitted to avoid the purchase of a costly p.v. generator. An advantage of the simulation technique is that the voltage-current characteristic of a panel can be extrapolated from the characteristic of a small sample. In a next phase, the behaviour of the phase controlled rectifier used as an inverter has been investigated. We also obtained a general expression for the efficiency of the inverter. It has been shown how the dimensions of the inverter transformer and inductor affect the power losses. Measurements made on a practical 3 phase inverter confirm the theory. The design criteria for the inductor were also established. In this phase the behaviour of the switching regulator power supply, adapted as a circuit for power inversion, was also studied. This type has several advantages such as the low weight and the generation of a pure current have form. The efficiency of the complete system (with thyristors and mains transformer) is about the same as for the phase controlled rectifier. A practical control system, suitable for both types of inverters and which permits operation of the p.v. generator at its maximum power point, has been developed. Finally, the influence of the weather conditions on the design parameters of the phase controlled rectifier was determined by means of statistical data.

33363 **Photovoltaics and passive: the house of the future.** Strong, S.J.; Osten, R.J. Jr.; Elliott, C.W. (Solar Design Associates, Lincoln, MA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 661-663(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The U. S. Department of Energy predicts that residential photovoltaics applications will become cost-competitive during the 1980s, perhaps as early as 1986. This paper will present the results and conclusions of work in the design and engineering of residential photovoltaic systems, with specific emphasis on the integration of PV systems with passive solar residential architecture, using the performance results of live-in residence in Carlisle, Massachusetts as a case study.

33364 **Photovoltaic/passive solar residential systems.** Maloney, T.J. (One Design, Inc., Winchester, VA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 726-729(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Photovoltaic technology was related to superinsulated, passive solar heated, residential design with the intent of mass market penetration for 1986. The 1986 cost projections were subjected to life cycle cost analysis and found to yield short term payback, instant positive cash flow and annual total fuel costs near zero. The design includes innovation in the design of the photovoltaic array with emphasis on installation and maintenance cost and labor procedures. Cost effectiveness is found to be related largely to reduction of loads via state-of-the-art passive solar and conservation measures.

1407 Solar Thermal Power Systems

REFER ALSO TO CITATION(S) 33539

33365 **(SAND—83-8213) Thermal-mechanical fatigue-test apparatus for solar-receiver tubing.** Hughes, D.A.; Spingarn, J.R. (Sandia National Labs., Livermore, CA (USA)). Apr 1983. Contract AC04-76DP00789. 26p. NTIS, PC A03/MF A01. Order Number DE83011930.

To assess the effects of thermal versus isothermal fatigue on solar-receiver tubing, a rigid-frame test apparatus was built. A description of this apparatus and the results from thermal-mechanical strain cycling of actual Solar One tubing are reported. The test, which includes cycling between compressive strain limits and a hold period of 6 hours at the peak temperature of 922 K, demonstrates that solar thermal cycling produces elastic-strain ramps and a large tensile mean stress. Stress relaxation continues to occur during every temperature hold period and, as a result, a steady-state hysteresis loop is not obtained after 45 cycles.

1408 Ocean Thermal Gradient And Salinity Gradient

Power Systems

REFER ALSO TO CITATION(S) 33283, 33284, 33285, 33286, 33287, 33288, 33289, 33290, 33291, 33292, 33293, 33294, 33298, 33299, 33300, 33301, 33302, 33303, 33304, 33305, 33306, 33307, 34259

33366 (CONF-810622—Vol.2) **Proceedings of the 8th ocean energy conference.** (Marine Technology Society, Washington, DC (USA)). Jun 1981. Contract W-31-109-ENG-38. 445p. (DOE/CONF—810622-Exc.-Vol.2). NTIS, PC A24. Order Number DE83003789.

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted.

Separate abstracts were prepared for 62 papers in this volume of conference proceedings. Two other papers were previously abstracted for EDB. (LEW)

33367 (CONF-810622—Vol.2, pp 587-593) **Methods of predicting loading and bending induced in an OTEC riser cable.** Lindman, R. (Giannotti & Associates, Inc., Annapolis, MD); Costantino, R.W. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

One of the key elements in the successful design of a power transmission riser cable for the OTEC program is the ability to predict dynamic tension and bending. The riser cable must be able to withstand variations in tension and bending imposed on it from the motions of an OTEC platform and its environment. In addition to being able to withstand extreme loading conditions the cable must be designed so as not to fail due to mechanical fatigue of its structural components. Two methods of predicting dynamic tension and bending are presented. One method uses a discrete lumped mass system to model the cable, while the other uses energy techniques to provide a continuous solution. Both methods are used to develop a set of cable transfer functions for tension and bending. Statistical techniques are then employed to develop predicted yearly tension and bending histories. These are used to predict fatigue in specific cable components. The lumped mass model has been used to provide a predicted static tension with the cable loaded only by its own weight and steady-state current conditions.

33368 (CONF-810622—Vol.2, pp 595-597) **Testing of OTEC riser cable components and models.** Kurt, J.P. (Simplex Wire & Cable Co., Portsmouth, NH). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

To indicate the suitability of the material selections for the prototype OTEC riser cable designs, a series on riser cable components and riser cable models were performed, focusing on the external strength member and the sheath. The external strength member must support the entire weight of the OTEC riser cable. The main function of the sheath is to protect the insulation from moisture ingress. Tests include corrosion studies and fatigue measurements. (LEW)

33369 (CONF-810622—Vol.2, pp 599-602) **Electrical/mechanical cable test machine design and operation.** Lawson, J.E. (Simplex Wire & Cable Co., Portsmouth, NH); McNerney, N.E.; Onge, H.S. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper describes the design and operation of an electrical/mechanical (E/M) testing machine that is used to evaluate the performance of prototype OTEC riser cable designs. The E/M testing machine subjects samples of test cables to simultaneous dynamic tension, dynamic bending, voltage stress and current while the cable samples are in a seawater environment.

33370 (CONF-810622—Vol.2, pp 603-605) **Testing of full scale prototype OTEC riser cables.** Roblee, L.H.S.; Schultz, J.A.; Kurt, J.P. (Simplex Wire & Cable Co., Portsmouth, NH). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Two lengths of full-scale 100 MW prototype OTEC riser cable have been manufactured and will be exposed to a series of tests. Mechanical tests include tension-elongation tests, bending stiffness measurements, hydrostatic pressure test, sidewall pressure test, and a sleeving test that measures the load to push or pull the conductor out of the cable. In addition, an elaborate electrical/mechanical fatigue test is described. (LEW)

33371 (CONF-810622—Vol.2, pp 607-616) **Developmental design status of riser cable systems for OTEC pilot plants.** Schultz, J.A. (Simplex Wire & Cable Co., Portsmouth, NH); Dalton, T.C.; Eaton, R. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper presents the three basic design concepts of riser cable systems for 40 MW floating OTEC pilot plants and describes the various items of hardware and cables which comprise the riser cable system. Particular references are made to the 40 MW spar and plantship platforms designed for specific sites off Puerto Rico. Further discussions on spar and plantship riser cable system designs concern comparisons of their key aspects and review of their conceptual deployment schemes. Conclusions from the spar and plantship riser cable systems designs are reviewed with parametric analyses. Recommendations present future developmental efforts necessary to ensure successful riser cable system designs for 40 MW pilot plants.

33372 (CONF-810622—Vol.2, pp 625-632) **OTEC subsea electrical power cable protection systems and technology.** Nunn, G.N. (Brown & Root Development, Inc., Houston, TX). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A study of existing technology for the protection of subsea OTEC cables is reported. The systems are being considered for application anywhere from the shoreline to the deep ocean. The systems include trenching/burial systems as well as other not so familiar systems. The survey has shown that several cable trenching/burial systems can be adapted for use in the protection of OTEC electric power cables from OTEC plants to a utility grid on shore. The variation of design and operational parameters at different potential OTEC plant sites appears to exclude any expectation for the development of an all purpose system for all OTEC installations. If existing equipment does not satisfy the requirements of a given site's route, the conventional approach is to develop a combination of methods which will meet the needs of the present project.

33373 (CONF-810622—Vol.2, pp 633-642) **OTEC and island industry synergy: the St. Croix case.** Jones, M.S. Jr. (Ebasco Services, Inc., Newport Beach, CA); MacInnes, J.D.; Green, W.L.; Blake, T.R. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The US Virgin Islands has developed a plan to use OTEC to generate electricity and fresh water, and to supply nutrient rich deep seawater for land based mariculture and aquaculture facilities. Projects of this nature have the potential to ameliorate shortages of food, fresh water and energy which limit the possibilities of improving life for inhabitants in many of the world's tropical islands. The project has been sized to provide 12.5 MW of electricity, up to 5 million gallons per day (MGD) of fresh water and 50 MGD of deep seawater. Its output would offset between 250,000 and 275,000 Bbl of petroleum products derived from imported oil currently used to generate electricity and desalination.

33374 (CONF-810622—Vol.2, pp 643-648) **OTEC aluminum intergration studies.** Jones, M.S. Jr.; Thiagarajan, V.; Sathjanarayna, K. (Reynolds Metals Co., Sheffield, AL). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2). Contract AC02-78ET20565.

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The feasibility of using OTEC power to produce aluminum was studied under different geographic, commercial and production scenarios. Projection of returns on investment from such projects was made using the method of discounted cash flow analysis. Three different ways of producing aluminum were considered. The conventional Hall reduction process was considered for shore based applications where the OTEC power was delivered by cable. The Hall process with drained cathode cells and the aluminum chloride reduction process were considered for OTEC plantship applications. Cases were considered where the reduction plant was located on shore at various geographic locations or on the OTEC platform. These were compared with a baseline case of conventional Hall process reduction plant situated on the US Gulf Coast. Geographic locations, other than the US Gulf Coast, offer many advantages. The ΔT near the tropical islands such as the US Virgin Islands, Puerto Rico, and Mindanao in the Phillipines Islands etc., ranges up to 24°C which reduces the cost of the OTEC power units. The high ΔTs are available close to shore (ranging from 1.5 to 20 nautical miles) which reduces the cost of power transmission. The effects of location, labor rates and tax policies were also investigated. The capital and operating costs were estimated for the different scenarios considered and the rates of return were computed by discounted cash flow analysis. The maximum rates of return projected ($\approx$ 18.4%) are for a chloride process plant situated on the US Gulf Coast, powered by OTEC through a 100 mile cable. For a similar plant in the US Virgin Islands, with a 3 mile cable, the rate of return is projected at 18.3%.

33375 (CONF-810622—Vol.2, pp 665-673) **OTEC produced ammonia: an alternative fuel.** Richards, D.; Henderson, R.W. (Johns Hopkins Univ., Laurel, MD). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A survey of prior work on the use of ammonia as a fuel and results of preliminary investigations of its use in ship and land vehicle propulsion systems are presented. Ammonia is a synthetic fuel which can be made at sea on cruising Ocean Thermal Energy Conversion (OTEC) plantships using only hydrogen from seawater (via distillation and electrolysis) and nitrogen obtained from the air by a liquefaction process. The projected f.o.b. price of OTEC ammonia delivered to US ports from commercial plantships in 1990 is ~ $260/short ton (in 1980 $'s). Systems and technology for distributing ammonia by pipeline, barge, rail and truck for fertilizer and chemical markets in the US already exist. Additional distribution systems for fuel markets can be developed, and OTEC ammonia may well become an economical fuel in the near future, particularly in economies or distribution areas dependent on foreign oil. Ammonia fuel, although toxic and presenting different hazard/safety considerations, is easily handled, transported, and stored and has a lesser fire-explosion risk than most liquid fuels.

33376 (CONF-810622—Vol.2, pp 675-678) **OTEC power applications to deep ocean mining.** Grote, P.B. (Science Applications, Inc., La Jolla, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The possibilities for processing manganese nodules using OTEC power are reviewed. The key aspects of a pyrometallurgical processing approach have been identified; however, an economic analysis remains to be done. Some major preliminary conclusions resulting from this study can be stated as follows: OTEC sites are highly compatible with DOM processing requirements; the OTEC approach to nodule processing should be considered after at least one of the two technologies has been proved; transport fleet requirements are greatly reduced - common bulk carried for onshore-island, transport with de-watering equipment for mine ship to island are required; ferromanganese can be transported to steel plants and sulfide concentrate to existing facilities (in US, Japan, and South America) which may not be located at the same place; island to shore concentrate and ferromanganese transport functions and costs can be assumed by metals buyers; and pyrometallurgy provides a practically inert waste product for at sea disposal.

33377 (CONF-810622—Vol.2, pp 679-683) **Advanced water electrolysis technology for efficient utilization of ocean thermal energy.** Nuttall, L.J. (General Electric Co., Wilmington, MA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

One of the major concerns with ocean thermal energy is how the resultant power can best be utilized in view of the remote location of the source from power demand centers. Hydrogen in the form of ammonia represents one promising solution to this problem since it can be produced on board an OTEC plantship and transported to any point on the globe. The General Electric Company is developing the solid polymer electrolyte water electrolysis technology which offers high efficiency and low cost in a compact system suitable for installation in an OTEC plantship. This paper describes the solid polymer electrolyte development program which has the potential for demonstrating a 20 MCFH module by 1984. A conceptual 40 MW system configuration, utilizing multiple 20 MCFH modules, is described for application to a pilot OTEC plantship. The potential of further scale-up to full scale (i.e., $\geqq$ 350 MW) OTEC plantships is also discussed.

33378 (CONF-810622—Vol.2, pp 685-693) **Advanced alkaline electrolysis systems for OTEC.** Kincaide, W.C.; Murray, J.N. (Teledyne Energy Systems, Timonium, MD). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Systems work has been oriented towards the development of a new hydrogen generator product line with capacities of up to 1500 SCFH (150 KW/sub e/). Although this new line of industrial generators is much smaller than that reqired for OTEC, the basic process loop is representative of large equipment and is directly scalable. A comprehensive economics computer model was developed to allow a true benefit evaluation of research products. As has been noted by several investigators, given an electrolysis module design and fixed financial constraints such as operating cost rates and capital expense consideration, there is a minimum hydrogen cost when this value is calculated as a function of the module current density. The value of this hydrogen cost as well as the optimum module design current density is a function of many factors, and the Model for Alkaline Water Electrolysis Systems (MAWES) attempts to consider all. The MAWES Program was restricted to system sizes less than 1 MW power input. Work is now underway to modify the program so that systems up to several hundred MW can be evaluated. This paper discusses an alkaline electrolysis system for a 40 MW/sub e/ OTEC. Basic systems design considerations are discussed along with the relative economic impacts. Scale-up beyond 40 MW is also addressed.

33379 (CONF-810622—Vol.2, pp 695-698) **OTEC energy transference via biomass: the pros and cons.** Mencher, F.M.; Spencer, R.B. (Univ. of Hawaii, Honolulu). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Biomass may be produced from OTEC effluents through aquaculture, or OTEC energy may be used to convert terrestrial biomass to liquid fuels and chemical feedstocks. The added value of biomass used for energy probably does not justify the cost to produce it, but food production appears promising. The value of food production may exceed that of electricity production if various difficulties can be overcome. Some systems might lead to a significant savings in fossil fuel used to produce animal protein.

33380 (CONF-810622—Vol.2, pp 717-722) **Constructability of extended surface heat exchangers for OTEC.** Foust, H.D. (Trane Co., La Crosse, WI). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper deals with the issues of manufacturability, performance, compactness, serviceability, modularization, seawater worthiness, and cost effectiveness of OTEC heat exchangers. Several active test programs will be discussed that are intended to address the issue of sea-water worthiness of the compact brazed aluminum OTEC heat exchanger concept. In addition, the paper challenges the generally accepted notion that the very success of the OTEC program depends on innovative heat transfer surfaces to reduce required surface area and hence unit cost.

33381 (CONF-810622—Vol.2, pp 723-732) **Application of OTEC-1 performance and fabrication cost data to estimation of OTEC power system cost.** Yarden, A.L. (Southwestern Engineering Co., Los Angeles, CA); Snyder, J.E. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2). Contract AC03-77ET20444.

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Recent experiments conducted onboard OTEC-1 off Hawaii ave resulted in considerble data on the thermal/hydraulic performance of a 1 MWe scale heat exchanger test loop. These data can be readily scaled up to heat exchangers and power system components at the 5 MWe scale. The design and fabrication of the 1 MWe test articles, instrumentation, and auxiliary equipment were specific to the experimental test objectives of the OTEC-1 program. Thus, equipment costs are specific to the test articles and are not typical of those for production designs. The purpose of this paper is to develop an OTEC power module cost estimate based on the extensive itemized fabrication cost data for the 1 MWe test articles, their measured performance onboard OTEC-1 and changes in the test article designs to exclude test specific features. The result is an OTEC power system module cost estimate based on off-the-shelf hardware cost and performance data. These data can serve as a benchmark for future improvements in OTEC technology and expected reductions in capital cost.

33382 (CONF-810622—Vol.2, pp 733-740) **Development of large thrusters for dynamic positioning of OTEC systems.** Bartholly, H.; Deter, D.R. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The dynamic positioning of OTEC platforms and other large offshore structures requires propulsion devices of larger performance capabilities than the ones manufactured at present. Even under moderate environmental conditions, the shape and size of the platform and its appendixes such as the cold water pipe, will cause a high resistance aginst current. To counteract the current forces by installing a high number of conventional propulsion thrusters may be less desirable for reasons of installation and control problems. This paper discusses the development of two different designs of propulsion thrusters, which have more than twice the performance capabilities of the thrusters available at present. The first design alternative is a large horsepower (6000 HP) right angle gear type thruster. The second design is a combination of a submersible motor with an integral reduction gear driving a controllable pitch propeller. The result of this design is a relatively low-weight, compact, self-contained propulsion arrangement.

33383 (CONF-810622—Vol.2, pp 741-745) **Commercial aspects of OTEC power cable manufacture.** Wilson, J.L.; Richard, J.L. (Simplex Wire and Cable Co., Portsmouth, NH). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

This paper discusses the essential capabilities required of a US cable manufacturer to successfully build the submarine power cable required by commercial OTEC power plants. The paper will illustrate that the domestic manufacture of the OTEC power transmission cable is a realistic and attainable goal and a promising business venture. Market demand and the time frame of manufacture for the OTEC power cables outlined in Public Laws 96-310 and 96-320 passed by Congress in 1980 are utilized in development of the paper. A brief review of existing US power cable technology and cable manufacturing capacity will be presented. A detailed plan will be shown which illustrates the additional factory components necessary to complete the US manufacturing capability to produce the OTEC cables. Easential material suppliers will be defined and financial aspects of this effort will be addressed.

33384 (CONF-810622—Vol.2, pp 747-751) **Constructability of submarine bottom cables for OTEC power transmission.** Morello, A.S. (Societa Cavi Pirelli S.p.A., Milan, Italy). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The most promising submarine bottom cables for OTEC purposes are solid paper impregnated cables and self-contained oil-filled cables. These cables do not offer electrical problems. Instead, important difficulties arise from the expceptional laying depths. Important preliminary research and development work is necessary to correctly define the detailed cable construction for each actual case. A short description is given of the manufacturing facilities to be installed in a factory intended to produce the mentioned cable types in very long lengths and suitable to great depths.

33385 (CONF-810622—Vol.2, pp 753-758) **Turboexpanders for OTEC power plant (VA 8).** Holm, J. (Rotoflow Corp., Los Angeles, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Substantial energy can be recovered from low grade waste heat, process gas, or waste gas pressure letdown. Centripetal (radial inflow) turboexpanders are well adapted to such energy conservation schemes. With recent developments, which have increased their reliability, they are quite capable of unattended service in Rankine cycles on a 24 hours, 7 days-per-week operational basis. One such application is Ocean Energy. A Mini OTEC demonstration program, completed in 1979, utilized a closed Ammonia cycle to drive a 50 kw Turboexpander generator unit. The Mini OTEC Barge was installed off the coast of Hawaii and used the warm ocean surface waters as a heat source and the cold waters from the depths as a heat sink. Detailed process description will be presented together with Expander design, instrumentation and control systems used for Mini OTEC Program. Special Expander features such as variable inlet guide vanes, special Ammonia Seal system, and speed control will be discussed. Turboexpanders for future Demonstration (OTEC-1) and full scale power plants are available without any new development being required.

33386 (CONF-810622—Vol.2, pp 759-767) **Availability of offshore industry technology for construction of ocean energy facilities.** Wortman, E.J. (Tokola Offshore, Inc., San Francisco, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The offshore petroleum industry has developed a wealth of specialized technology that is directly applicable to construction of ocean energy facilities. This technology makes the offshore industry a primary source of methods, equipment and personnel for building such facilities. In planning for construction of ocean energy facilities, it is advisable to maximize reliance on existing technologies, such as offshore industry technology, because of the time and costs associated with development of new construction technology. On the other hand, there are definite limits to what can be done with existing construction technologies. Consequently, in view of the unprecedented nature and scale of many of the proposed ocean energy facilities, it is essential to exploit existing technologies to their limits in order to maximize feasibility construction of the facilities.

33387 (CONF-810622—Vol.2, pp 769-774) **Building ocean thermal energy conversion facilities and plantships: requirements for unique construction facilities.** Francis, E.J. (Johns Hopkins Univ., Laurel, MD); Richards, D.; Rogalski, W.W. Jr. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The construction of OTEC facilities and plantships is a major undertaking which will require a full range of specialized skills and resources. Near-site cold water pipe construction and deployment and the placement of deep water moorings and subsea electric cables will require specially designed equipment with large capacity. Vessels with barge-type hulls, bottom-mounted off-shore platforms, and land-based OTEC facilities will all differ in their requirements for construction facilities. While the construction sites themselves will also differ in the additions needed for OTEC construction, the similarity of needed facilities is expected to be greater than the differences. This paper examines a specific case for OTEC construction which may be instructive.

33388 (CONF-810622—Vol.2, pp 775-778) **Mini-OTEC 2 program plan for electrochemical and synthetic fuels demonstration.** Burwell, D.; Fuller, R.; Trimble, L. (Lockheed Missiles & Space Co., Inc., Sunnyvale, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A plan has been presented for a Mini-OTEC second deployment which will be directed toward an OTEC mission to demonstrate the manufacture of synthetic fuels and electrochemical products, and to perform OTEC research to substantiate and expand on the data base acquired from the first deployment. Lockheed is in the process of soliciting participants to shore the research costs of the project and the probability is high that we will be successful; however, the zeroing of the federal OTEC budget has had a detrimental impact on the organizational plans. In light of the uncertain plans within the federal government, an operational OTEC plant will play an important role within private industry in their efforts to commercialize the OTEC industry. The original Mini-OTEC facility successfully operated for approximately 3 months and generated a maximum net power of 18.2 kw, which was higher than the original design estimate of 10 kws. The electrical power was dissipated into demonstration lights and heaters; however, for the next research project, the electrical power will not be wasted, but will be used for useful work. The project is scheduled to be deployed in the late summer of 1981 and is to remain on station for approximately one year.

33389 (CONF-810622—Vol.2, pp 779-788) **Capabilities and potential of the SS Ocean Energy Converter as an ocean test facility.** Borchardt, D.R.; Wetmore, S.B. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The SS Ocean Energy Converter, is a floating test facility presently being operated to evaluate the in situ performance of 1 MW/sub e/ heat exchangers and ancillary equipment. With the proper programmatic, technical, and financial funding, this government-owned facility could be used by other interested parties for conduct of piggyback research, experiments, parallel engineering studies or other non-OTEC related developmental test programs. This paper introduces the reader, and potential user, to the four major elements of the test facility; the platform, the cold water pipe, the OTEC plant, and the single point mooring.

33390 (CONF-810622—Vol.2, pp 789-793) **Capabilities and potential of the OTEC seacoast test facility.** Hallanger, L.W. (Seacoast Test Facility, Honolulu, HI). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The Seacoast Test Facility was conceived, designed, and is being built as a shore based research laboratory in which experimental verification and small scale demonstration of OTEC technology developments can be conducted under controlled but realistic conditions. Current capabilities are based on the existing 1000 gpm warm seawater supply system, a 3000 square foot laboratory building, a 6000 square foot test pad, and supporting facilities. The current research effort is focused in biofouling countermeasures and includes 18 heat transfer modules. Future potential includes a 6400 gpm cold and 9600 gpm warm seawater supply system.

33391 (CONF-810622—Vol.2, pp 795-801) **Utilization of the oceans for sub-scale testing of OTEC components.** Deffenbaugh, F.D. (TRW Defense and Space Systems Group, Redondo Beach, CA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

An experimental investigation was conducted at sea near Catalina Island, California to determine the effect of ocean waves and currents on the motion of an Ocean Thermal Energy Conversion (OTEC) Cold Water Pipe (CWP). An 8.625 inch diameter 70 ft long polyvinylchloride model pipe was suspended from a 1/30 scale OTEC barge platform and tested in a moored and grazing configuration. Measurements of strain were made at five axial stations along the pipe length. The results of the grazing tests indicated that lock-on of vortex shedding could occur in several pipe models. The power spectra of the stress for towing tests at 2.40 ft/sec and 2.45 ft/sec showed large peaks at 0.53 Hz and 0.88 Hz, respectively. These frequencies correspond to second and third pipe bending modes. Pipe dynamics were predicted using TRW's time domain response program HULPIPE. The predicted pipe stress was close to the experimentally measured values.

33392 (CONF-810622—Vol.2, pp 803-808) **Test of OTEC plant in Imari Bay.** Uehara, H.; Kusuda, H.; Monde, M.; Nakaoka, T.; Yamashita, T.; Maeda, N. (Saga Univ., Japan). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

A 50 kw class OTEC power plant (Imari 2) was constructed in 1980 and settled in Imari Bay, Imari city, Saga prefecture, Japan, where is selected to operate this plant using sea water. The tests have been carried out for the performance of heat exchangers, turbine and generator which the Imari 2 consists of. The present paper describes these results.

33393 (CONF-810622—Vol.2, pp 821-826) **Approach to risk assessment in OTEC development planning.** Shipman, H. Jr.; Shepherd, R.F.; Gantz, D.; Greenland, A. (Meridian Corp., Falls Church, VA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

An approach to implement an ongoing risk assessment methodology was developed which is applicable to all phases of Pilot Plant design and construction. This methodology will provide a systematic mechanism for consolidating expert opinions into a framework that facilitates the orderly comparison of alternative designs. While traditional approaches to risk assessment for decision-making in an environment of uncertainty involve subjective evaluation of expert opinion, the proposed methodology uses such approaches as a departure point and injects several analytical features designed to make the risk assessment process more deterministic. These features include the use of historical data on cost overruns on major R & D programs; the use of statistical techniques to quantify and display individual and group risk estimates; the introduction of feedback from external sources into a Delphi process to facilitate convergence of estimates; and the classification of design alternatives into categories of risk (as opposed to calculation of preference rankings).

33394 (CONF-810622—Vol.2, pp 827-832) **OTEC utility users council 2000 A.D. market.** Marina, J. (Puerto Rico Electric Power Authority, San Juan); Bell, R.E.; Ridgeway, J.R.; Crews, J. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The OTEC Utility Users Council includes utilities who will most probably be the owners of OTEC electric power plants. It has been making an initial survey of what might be their use of OTEC electric power in 2000 AD. Considered are: plant ownership, fuel trends, OTEC commercial criteria, pilot plant program participation, and the OTEC program. (LEW)

33395 (CONF-810622—Vol.2, pp 833-839) **OTEC personnel consideration.** Byler, E.; Gardy, D. (Advanced Marine Enterprises, Inc., Arlington, VA). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Operating procedures for Ocean Thermal Energy Conversion (OTEC) plants is one of several entirely new areas that need consideration prior to the development of an OTEC industry. One large aspect of this area is the plant manning requirements. This paper addresses the manning question in terms of personnel training, operator licensing, and labor considerations. Manning estimates are made based onte engineering requirements for the different prototype concepts under consideration by the consortia involved in OTEC development. In addition to engineering requirements, the labor mix chosen depends on the education level desired and available. Support personnel are included in the personnel estimates. Licensing procedures and education requirements used by state agencies for stationary power plants and by the US Coast Guard for the merchant marine are compared with the guidelines now under consideration by NOAA and USCG. Minimum criteria for personnel currently anticipated by plant operators are examined. Training programs for both immediate, plant-specific instruction and for long term secondary education are discussed. Included here is an evaluation of simulators to increase operator proficiency and plant safety. A college program is outlined that would give graduates the requisite abilities to work effectively in the OTEC environment. A functioning organization structure and job fulfillment are also essential components to the successful commercialization of the OTEC concept. Having studied the optimum labor mix for plant operation, the paper describes the living environment needed to attract the people necessary. Working shift lengths are evaluated as are the domestic and recreational requirements.

33396 (CONF-810622—Vol.2, pp 841-848) **Ocean Thermal Energy Conversion plant dynamic simulation models.** Wormley, D.N.; Umans, S.D.; Frydenlund, A.; Carmichael, A.D.; Sotelo, J.; Bertinelli, F. (Massachusetts Inst. of Tech., Cambridge). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Dynamic simulation models for Ocean Thermal Energy Conversion (OTEC) plant utilizing a closed Rankine power cycle have been developed. The models represent the conversion of energy from the thermal gradient in the ocean to electrical energy delivered to an electric bus on shore. The models are useful for the evaluation of plant dynamic performance, control and regulation. The dynamic performance of a 50 MW modular prototype plant to disturbances in ocean thermal and seastate disturbances and electric bus disturbances is evaluated.

33397 (CONF-810622—Vol.2, pp 853-855) **United States Coast Guard and OTEC development.** Watts-Fitzgerald, T.A. (US Coast Guard, Washington, DC). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.21).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The Ocean Thermal Energy Conversion Act of 1980 contained an exception to the one-stop licensing scheme it established. That exception was in favor of the Coast Guard's traditional role inte documentation, inspection, certification, construction and manning of US flag vessels and registered structures. To meet the needs of this emerging industry, and to discharge its mandate to insure the safety of lives and property at sea, the Coast Guard will tailor existing regulations to set specific standards for regulated OTEC facilities and plantships. The OTEC Act specifies that certain regulatory actions must be taken within prescribed periods. Other areas amenable to regulation are left in the discretion of the agencies concerned, for regulation at some future date. Initially, the philosophy of the Coast Guard has been to implement OTEC-specific regulations only to the extent required by the law, holding in abeyance the discretionary authority conveyed by the Act pending a demonstrable need for additional agency action. The absence of a historical data base upon which to found safety regulations demands such a flexible approach to avoid expensive overregulation; expensive for the industry and expensive for the Coast Guard. This approach is the most appropriate of the possible alternatives to assist in the removal of legal and institutional uncertainties which could impede the commercial application of the OTEC concept.

33398 (CONF-810622—Vol.2, pp 971-976) **Overall OTEC-1 status and accomplishments.** Castellano, C.C. (Dept. of Energy, Washington, DC). Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The Department of Energy (DOE) has successfully built and operated the world's first at sea ocean thermal energy conversion (OTEC) test facility, OTEC-1. Using a World War II T-2 US Navy tanker, DOE refurbished and converted this tanker into a facility for testing OTEC systems, heat exchangers and components. OTEC-1 operated from mid-December of 1980 to April 1981. OTEC-1 was terminated in April 1981 due to fiscal year 1981 budget cuts.

33399 (CONF-810622—Vol.2, pp 977-990) **OTEC-1 heat exchanger test results.** Lorenz, J.J. (Argonne National Lab., IL); Yung, D.; Howard, P.A.; Panchal, C.B.; Poucher, F.W. Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Heat exchanger test results for the first deployment of OTEC-1 are reported. These tests were aimed at evaluating the performance of a state-of-the-art 1MW/sub e/, titanium shell-and-tube evaporator and condenser in an ocean environment. The evaporator was unique in that it consisted of both a plain and an enhanced (Union Carbide High Flux) tube bundle, whereas the condenser had plain tubes only. All tests with the evaporator were conducted in the sprayed-bundle mode. Experimental results for the condenser and plain-tube portion of the evaporator were found to be in excellent agreement with performance predictions - there were no adverse surprises. This result is important because it demonstrates that the thermal performance of large plain-tube heat exchangers can be predicted with a high level of confidence. On the other hand, performance of the enhanced-tube portion of the evaporator was much lower than predicted. Evidence strongly suggested that this poor performance was attributable mainly to fouling of the High Flux surface by corrosion products consisting predominantly of hydrated aluminum oxides.

33400 (CONF-810622—Vol.2, pp 991-996) **Analysis of the up-ending problem of OTEC-1 cold water pipe.** Gershunov, E.M.; Ozudogru, Y.H.; Betts, J.M. (Global Marine Development, Inc., Irvine, CA). Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

During 1979 to 1980 Global Marine Development, Inc. was the prime contractor to the US Department of Energy for design and construction of the Ocean Energy Converter. The project was part of a test program for the investigation of the potential utilization of ocean thermal energy. The Cold Water Pipe (CWP) used on this system was successfully deployed in November 1980. The on-site up-ending of the CWP was the most critical problem in the deployment operation. This paper describes the analytical approach and the results developed for solving the hydroelastic problems concerning the CWP on-site up-ending. Four different up-ending schemes were studied. Based on this analysis, the most suitable method of the up-ending CWP was determined and carried out during the deployment. The recommended CWP up-ending scenario is also discussed.

33401 (CONF-810622—Vol.2, pp 997-1001) **Bubble entrainment on OTEC-1: implications for future OTEC designs.** Goetz, T.E. (Rockwell International, Canoga Park, CA). Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Problems were experienced in seawater flow measurements aboard the OTEC-1 vessel. Gas bubbles in the seawater systems

prevented proper operation of the flowmeters. Air entrainment in the sump and gas evolution were identified as bubble sources. Remedies included increasing the sump water level and system backpressure. Neither resulted in proper flowmeter operation, however, bubble presence was significantly reduced by the increased sump water level. Gas evolution and air entrainment can be prevented by appropriate system and sump design such as those provided by Hydraulic Institute Standards. Non-standard sump designs can be verified by scale model testing. Degassing can be minimized by limiting piping elevations and pressure drops. The benefits of bubble elimination must be balanced against the costs of preventing bubbles.

33402 **(DOE/ET/29147—6) Electric-utility-system planning studies for OTEC power integration by Puerto Rico Electric Power Authority. Final report.** (Puerto Rico Electric Power Authority, San Juan. Electrical Planning and Research Div.). Jun 1982. Contract AC02-79ET29147. 154p. NTIS, PC A08/MF A01. Order Number DE83012233.

The steady-state analysis of the Puerto Rico transmission network with the OTEC unit at four alternate sites was conducted, and the economic implications of each alternative were determined. All but the site located on the east coast were found to cause abnormal flows on the benchmark system during single contingency conditions. This one exception, the Yabucoa site, required no changes or improvements to the network, while the other locations needed the addition of new circuits. The study revealed that with the OTEC plant located on the east coast where land-use policies in effect prohibit the construction of a fossil plant, significantly lower transmission losses resulted. An economic analysis showed that taken over the life of the plant, these savings could amount to over $30 million compared to the cost for energy losses in the Base Case. It may be inferred that a near optimal regional load-generation balance could be reached from the substitution of additional future fossil fuel units by OTEC units. Thus lowering transmission costs and gaining potential savings in land for plant sites and rights-of-way. This is a particularly attractive benefit in the light of severe land resource restraints in the island of Puerto Rico. In conclusion, it is recommended that the 400 MW OTEC Plant be located off Punta Guayanes, and that it be connected to the 230 KV substation at Yabucoa.

33403 **(DOE/NOAA/OTEC—24(Vol.1)) Ocean thermal energy conversion cold water pipe workshop. Volume I of III.** (National Oceanic and Atmospheric Administration, Rockville, MD (USA). Office of Ocean Engineering). 1979. Contract AI01-77ET20396. 227p. (CONF-790171—(Vol.1)). NTIS, PC A11/MF A01. Order Number DE83011600.

From Ocean thermal energy conversion cold water pipe workshop; Laurel, MD, USA (17 Jan 1979).

Volume 1 of the proceedings consist of an outline of the OTEC cold water pipe program and eight papers under the general headings of (1) analytical modeling and (2) analytical modeling and conceptual design. Papers under the first heading are entitled (1) Hydrodynamic design loads for the OTEC CWP; (2) The NOAA/DOE CWP elastic beam structural analysis methodology; (3) Vortex shedding and the OTEC CWP; and (4) Analytical modelling of the coupled dynamics of the OTEC cold water pipe and platform. Papers under the second heading are entitled (1) OTEC cold water pipe verification test program; (2) Three dimensional shell-like behavior of the CWP; (3) Assessment of existing CWP analytical mold; and (4) Bottom-mounted, buoyant, stab-in CWP.

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 32999, 33295, 33296, 33297, 33310, 33317, 33318, 33346, 33354, 33364, 33890, 33908, 33913, 33917, 33918

33404 **(COO—4142-11) Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report.** Lior, N. (Pennsylvania Univ., Philadelphia (USA). Dept. of Mechanical Engineering and Applied Mechanics). May 1983. Contract AC02-77CS34142. 24p. NTIS, PC A02/MF A01. Order Number DE83011862.

This report presents the information about the performance and acceptance of the urban row home (SolaRow) retrofitted by the University of Pennsylvania to solar heating, and is also an executive summary for the entire project, describing the 10 reports prepared for the DOE during the contract's duration. An excellent automatic data-acquisition/instrumentation system (64 channels) was designed, installed in SolaRow, and the performance of the system and its components was monitored and analyzed. Although the period of the contract was not long enough to have an adequate system shakedown and continuous operation and measurements over an entire year, sufficient data were obtained to indicate the tuning trends needed for the solar-system's optimization. Based on the data, an analysis was performed which showed that typically the straight-through DWH system (such as used in SolaRow) is more efficient and less costly than the recirculation system. The project served excellently for the education of students and of lay-visitors. The solar-retrofit system, a pilot for urban solar retrofit, was extremely well accepted in its environment. Much data are available on tapes, which would be reduced and analyzed further. This well-instrumented system is still fully operational and could provide much more information for solar applications in cities.

33405 **(IFU-B—22-82) Development of a solar, absorption-type refrigerator - preliminary study in the course of scientific cooperation between Austria and India.** Podesser, E. (Forschungszentrum Graz (Austria). Inst. fuer Umweltforschung). 1982. 137p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750899.

Portions are illegible in microfiche products.

Solar refrigeration is an interesting way of using solar energy. Solar refrigerators can be used in air conditioning systems, for food preservation, and for cooling of medicaments, either as stationary or as transportable units. The superiority of the solar thermal system is demonstrated by a cost analysis. Of the many working fluids tested, ammonia and water were selected because of their easy availability, low cost, simplicity of handling, and excellent thermodynamic and caloric charcteristics. The main purpose of the study was the development and construction of a solar refrigerator system for higher refrigerating capacities. A 12 kW experimental facility has been designed and constructed after detailed calculation of the thermodynamic processes involved. Laboratory tests resulted in some modifications of subsystems, the refrigerating cycle control, and the working fluid pump. The absorption-type cooling system has been tested for two months at the Institute for Constructional Engineering of Split University, Yugoslavia.

33406 **(LA-UR—83-990) Passive research and practice.** Balcomb, J.D. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 17p. (CONF-830520—3). NTIS, PC A02/MF A01. Order Number DE83011311.

From 2. international congress on building energy management; Ames, IA, USA (31 May 1983).

Passive-solar applications in buildings are described and examples are given to illustrate how research in the field has been approached. The major emphasis of the research has been on devising mathematical models to characterize heat flow within buildings, on the validation of these models by comparison with test results, and on the subsequent use of the models to investigate the influence of both various design parameters and the weather on system performance. Results from both test modules and monitored buildings are given. Simulation analysis, the development of simplified methods, and systems analysis are outlined. Passive-solar practice is described and the key elements that have led to successful passive-solar applications are discussed.

33407 **(LA-UR—83-1114) Heat storage and distribution inside passive-solar buildings.** Balcomb, J.D. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 16p. (CONF-830630—1). NTIS, PC A02/MF A01. Order Number DE83011171.

From International conference on passive and low energy architecture; Chania, Crete, Greece (27 Jun 1983).

Passive-solar buildings are investigated from the viewpoint of the storage of solar heat in materials of the building: walls, floors, ceilings, and furniture. The effects of the location, material,

thickness, and orientation of each internal building surface are investigated. The concept of diurnal heat capacity is introduced and a method of using this parameter to estimate clear-day temperature swings is developed. Convective coupling to remote rooms within a building is discussed, including both convection through single doorways and convective loops that may exist involving a sunspace. Design guidelines are given.

33408 **(N—8230622) Development of a day by day simulation of solar systems.** Duff, W.S.; Favard, G.J.; Denbraven, K.R. (Colorado State Univ., Fort Collins (USA)). 1981. 10p. Colorado State Univ., Fort Collins (USA).

Advantages of a simulation program for solar heating, cooling, and hot water systems using event incremented time-steps include short running times with accuracies similar to those of short fixed increment time-steps. Event incrementing is made possible through the use of analytic functions for data input. Currently, the ambient temperatures and radiation are entered as daily cosine functions or constants over a time-step. Loads may be represented as cosine waves, constants, or point values. This approach yields a substantially compressed data representation and allows direct analytic solutions for the system of nonlinear differential equations over long time-steps. These time-steps do not occur at fixed intervals, but instead are determind by events such as collector pump turn-on time, domestic hot water withdrawal, or a switch from solar to auxilliary usage. Resulting accuracies are close to those obtained from short time-step programs, while computer times are greatly reduced.

33409 **(NP—3770107) Efficient energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Final report. Pt. A.** Biasin, K.; Dreisbach, K.; Sperlich, V. (Energietechnik G.m.b.H., Essen (Germany, F.R.). Studiengesellschaft fuer Enerkgieumwandlung, -Fortleitung und -Anwendung). 1982. 56p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770107.

Portions are illegible in microfiche products.

Since August 1976 a solar collector system for heating the pool water has been operated in the open-air swimming pool at Wiehl. The solar collectors are flushed through by the pool water. As they only need to supply heat of low temperature they are of simple construction. With a difference of 8 K between pool water - and air temperature, which is the average difference during the bathing season, their efficiencies were between 60 and 70%. The average efficiency of the whole collector system is of course inferior: involved are the heat losses of the piping system, the heat losses by transient operation due to variations of the global radiation intensity and an irregular distribution of water to the single collectors. The measuring investigations showed that the average efficiency during the bathing season is of 50%.

33410 **(SERI/TP—254-1935) Revised renewable resource calculation procedures for the RCS program.** Bircher, T.L.; Sillman, S. (Solar Energy Research Inst., Golden, CO (USA)). Apr 1983. Contract AC02-77CH00178. 8p. (CONF-830622—3). NTIS, PC A02/MF A01. Order Number DE83010688.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Revised residential energy audit methods have been derived for thermosiphon air panels (TAPs) and sunspaces. The basis for these revisions is explained, examples of the results are presented, and the original and modified audit techniques are compared. The differences between the energy savings estimates for the original and revised methods are large. Compared to the new methods, the original techniques estimated TAP performance to be lower by as much as a factor of 2.3, and projected sunspace performance to be higher by as much as a factor of 2.4.

33411 **(SV-SOL—1982-5) Air/water heat pump in the block Brigaden, Linkoeping (Sweden).** (Swedish State Power Board, Vaellingby). Mar 1982. 15p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750533.

Technical features of the two heat pumps, 297 kW and 115 kW, are described. Operation experiences are reported, and the economy is discussed.

33412 **(TENRAC/EDF—050) Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report.** Vliet, G.C.; Srubar, R.L. (Texas Univ., Austin (USA). Center for Energy Studies). Mar 1980. Contract AS01-78CS35235. 99p. NTIS, PC A05/MF A01. Order Number DE83011815.

Portions are illegible in microfiche products.

A 12-unit student apartment building was retrofitted for solar heating and cooling and hot water. The retrofit of the all-electric building resulted in a system consisting of an array of 1280 square feet of concentrating tracking collectors, a 5000-gallon hot water storage vessel, a 500-gallon chilled water storage vesel, a 25-ton absorption chiller, and a two-pipe hydronic air conditioning system. The solar air conditioning equipment is installed in parallel with the existing conventional electric heating and cooling system, and the solar domestic water heating serves as preheat to the existing electric water heaters. The system was fully instrumented for temperature, flow rate, electrical power, and meteorological measurements. The data indicate that 11.2% of the cooling load was met by solar and 8.2% of the total load (cooling plus hot water) was met by solar. The performance of the collector array was determined to be approximately 60% of that suggested by the manufacturer. Steady-state chiller operation exhibited a C.O.P. very close to the manufacturer's specified performance values, but the time-averaged chiller C.O.P. is degraded due to cycling. The composite solar fraction (8.2%) is less than solar cooling only (11.2%) because there was no solar domestic hot water delivery during this monitoring period. The evaluation of system performance for the cooling season indicates a lower performance than expected. However, system performance in the cooling mode can be improved by better adjustment of the thermostats and controls. Continued data collection and analysis should be performed, to improve system operations, assess performance limits, and compare results with design projections.

33413 **6th national passive-solar conference.** Hayes, J.; Kolar, W. (eds.). Newark, DE; American Section of the International Solar Energy Society, Inc. (1981). 907p. (CONF-810925—). Publishing Office of the American Section of the International Solar Energy Society, Inc., 205B McDowell Hall, Univ. of Delaware, Newark 19711. Contract AC02-77CH00178.

From 6. national passive solar conference; Portland, OR, USA (8 Sep 1981).

Separate abstracts were prepared for the 164 papers in this conference proceedings. (LEW)

33414 **Non-instrumented performance evaluation of 335 passive solar homes.** Hamilton, B.; Sachs, B.; Alward, R.; Lepage, A. (Memphremagog Group, Newport, VT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* **6**: 3-7(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Class C non-instrumented performance evaluation audits were conducted on 335 passive solar homes throughout the United States between June 1980 and February 1981. Trained auditors acquired thermal and other descriptive information about these homes and their passive solar heating and cooling systems. Occupants provided subjective evaluations of performance of their own homes. Energy consumption and climate data for each site was acquired for one full year. While this data was far less costly to acquire than instrumented performance data, it contains a great deal of useful information on the performance of passive solar systems. Examples of the types of information which are contained in the Class C data are presented.

33415 **Performance analysis methodology for passive heating systems in the NSDN.** Spears, J.W. (Automation Industries, Inc., Silver Spring, MD). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 8-12(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Presented is the approach to the performance analysis of passive solar heating systems used by the National Solar Data Network (NSDN). This analysis method has been standardized for all passive systems in the NDSN to insure consistency in reporting the performance of various systems. The basic method used is the energy balance method where energy delivered to the structure equals the energy lost by the structure. All the energy flows in the building are monitored continuously with an average of 90 sensors in each building to measure weather; heat loss and gain, auxiliary energy and electrical energy consumption; operation of windows, doors, vents, and movable insulation, temperatures and relative humidity of the rooms; and surface and gradient temperatures of all thermal storage masses. The sensors are scanned continuously at 30 second or 5 minute intervals. Performance factors are calculated on the scan, hourly, daily, monthly and annual level. Various methods of calculating building load and solar energy used are presented.

33416 **Passive solar residential Class C monitoring program in the Northeast Region.** Saras, A.E. (Northeast solar Energy Center, Boston, MA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 15-19(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Class C Monitoring Program as performed under the Performance Evaluation of Passive/Hybrid Solar Heating and Cooling Systems Area Plan consists of a three-hour, on-site audit of passive solar homes to collect market and thermal data. This report focuses on highlights of the analysis of data gathered during the 200 home audits performed during 1980 and 1981 in the Northeast Region. Similarities among passive solar homes and the attitudes and perceptions of their occupants are examined from initial solar decision through the first heating season of occupancy. Selected performance data are also examined.

33417 **Load management and the La Vereda passive solar community.** Pyde, S.E. (Public Service Co. of New Mexico, Albuquerque). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 20-24(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Reviewed are preliminary data available from some of the passive solar homes now operational at the La Vereda subdivision in Santa Fe, New Mexico. The major emphasis is Load Management - an electric utility term pertaining to when and how much energy is used by the customer. A customer's home is considered to be Load Managed when its major demands for electricity occur at times during the day when the utility has surplus generation capacity. For most utilities this surplus occurs during the night and is referred to as the off-peak period. Compared to conventional electric homes, the La Vereda passive solar homes are Naturally Load Managed because most of their backup heating requirements occur during the utility's off-peak period. Naturally Load Managed homes like these allow the backup heating system to operate freely whenever the space needs heat. Load data from six La Vereda homes are compared to similar data from 1) a group of nonsolar super-insulated total electric homes, and 2) the utility's winter system peak day load profile. The comparison verifies the Natural Load Management characteristics of the well-designed passive solar home. The free operation of the backup heating system, especially during cloudy or severe weather, can reduce the Natural Load Management characteristics of the La Verda homes. Is it possible to Force Load Management on a home, regardless of weather conditions and still guarantee that all space heating requirements are satisfied with off-peak energy. One home at La Vereda is discussed that has an experimental Forced Load Management backup heating system designed to use energy only during the utility's off-peak period. Load data from this home is presented and compared to other homes at La Verda.

33418 **Actual cooling performances of underslab systems in Davis, California.** Ikeda, M. (Solar Concept Development Co., Davis, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 25-29(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Many active charge/passive discharge underslab rockbed systems are used as cooling systems to moderate the temperature swing during summer months. Two homes with the underslab rockbed systems using different distribution systems were monitored in Davis, California, during parts of June and July 1981. House No. 1 uses an opposed manifold supply and return system. House No. 2 uses a radial supply system with the return through openings along the southern foundation footings. The cooling performances of the rockbed systems were calculated from the data. During the monitoring, the average daily energy efficiency ratio (EER) was 7.9 for House No. 1 and 3.9 for House No. 2, while an average 17,4000 Btu/night and 32,300 Btu/night were rejected respectively.

33419 **Analysis of the Bergstedt residence. A double envelope house in Duluth, Minnesota.** Williams, C.W.; Kahn, A. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 30-34(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Described are the concept and results of a passive solar/double envelope house designed for the DOE Passive Solar Awards Program, 1978. The house was built in Duluth, Minnesota.

33420 **Thermal interaction in a hybrid house.** Kelley, M.; Slote, J. (Acorn Structures, Inc., Concord, MA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 35-38(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

For the past two years, the model home for Acorn Structures, Inc. has been monitored to study operating characteristics and efficiencies. This house is a hybrid with three hundred square feet of direct gain passive collector area and four hundred twenty square feet of low temperature liquid active collector. During the first heating season, the house was operated without night insulation. For the second heating season, night insulation was used on two hundred fifty square feet of south glazing. Temperature monitoring of various spaces and thermal mass elements as well as measurement of solar flux and flow rates in the active system allow separation of the heat sources and assessment of the contribution of each. Tandem operation of passive and active systems permits maximum solar collection without attendant problems of glare and overheating of large area passive systems. This paper discusses the interaction of the passive, active, backup, and internal gain energy sources. In addition, the effects of the thermal drapes on the overall heating requirements are discussed.

33421 **Novel analysis technique used in the Oregon passive monitoring project.** Reichmuth, H. (Oregon Dept. of Energy, Salem); Lambert, L. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 39-43(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The energy use by end use is monitored for six passive residences in Oregon in order to validate passive space heat expectations and to check energy demand forecasting assumptions for passive residential buildings. The level of monitoring is equivalent to class B but uses fewer data channels through the use of Hall Effect power sensors. A statistical presentation referred to as a passive signature is developed as an alternative to the concept of the solar fraction and as means of estimating space heat requirements of similar buildings in generalized locations.

33422 **Thermal performance of the Peterson Residence: a double shell envelope house.** Kunz, W.S. (Browne, Worrall and Johnson/Architects, Baltimore, MD). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 49-53(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Peterson Residence is a double shell envelope house located near Baltimore, MD and designed for the temperature climate of the Middle Atlantic Region. A multipoint strip chart recorder was installed in February 1981 to continuously monitor the thermal performance throughout the year. This report is based upon the preliminary data collected during March 1981. Performance results are presented and examined in strip chart format for March 1981.

33423 **Thermal performance of an earth-sheltered passive solar residence.** LaVigne, A.B. (Puget Sound Power and Light Co., Bellevue, WA); Schuldt, M.A. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 54-58(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Results are presented of the measured thermal performance of a direct gain, passive solar residence in the Pacific Northwest. The east, west, and north exterior walls of the house are bermed to within 12 inches (30 cm) of the ceiling; sliding interior insulated panels cover the double glazed, south facing windows when appropriate. The cost of the house construction was kept modest.

33424 **Performance results of the Dennis Demmel double shell home, Hartington, Nebraska.** Chen, B. (Univ. of Nebraska, Omaha); Maloney, J.; Wang, T.C.; Demmel, D. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 59-63(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

For two years the Dennis Demmel double shell home which is located in northeastern Nebraska has been monitored. Temperature, solar radiation and airflow measurements have been taken over the test period. A six channel DISA 56C16 airflow meter was used to monitor airflow patterns in the greenhouse, north plenum wall and crawl space. Two channels were required for each point. One measured speed and the other measured direction. This system was utilized in an attempt to detect the presence of air film layers that have been hypothesized to exist near the inner surfaces of the greenhouse and north plenum which cause internal convection loops to occur in each air cavity. Temperatures in the earth beneath the crawl space were also monitored in order to ascertain the efficacy of earth storage. In essence no surface air films have been observed to support the self convection theory for each air cavity and the earth beneath the crawl space does not contribute significantly to diurnal energy storage.

33425 **Comparison of monitored passive buildings.** Pollock, E.O. (Automation Industries, Inc., Silver Spring, MD). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 69-73(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Performance data for nine passive solar sites is presented. The monitored sites include six direct gain systems, four which use only the floor slab and walls for storage, and two which augment storage with containers of water. Two of the sites have greenhouses with a mass wall between the greenhouse and conditioned living space. The final site is a double envelope design. This paper will compare the performance of the four types of passive systems as well as discuss the variations observed in the performance of systems of the same type.

33426 **Parametric sunspace/rockbed studies using CALPAS3.** McKewan, T. (Solar Concept Development Co., Davis, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 98-101(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Sunspace rockbed (SSRB) systems have been in use for several years but many systems installed to date may have higher energy consumption than identical homes without rockbeds due to high rockbed pressure drops and/or poor control strategies. Additional development work is needed to improve and optimize designs. The SSRB parametric studies presented here were developed using the CALPAS3 computer simulation. This program models a combined house, sunspace, and rockbed storage system using hourly weather and solar data. Conclusions are drawn about the utility of rockbed storage and the validity of CALPAS3 as an SSRB computer model. This paper discusses sizing techniques and preferred controls for SSRB systems that may lead to higher COP's for both heating and cooling modes. Results from this study show how energy use varies with temperature control, and rockbed configuration. Performance data are also shown for a sunspace (SS) house without an underslab rokbed.

33427 **Thermosiphon floor heating system: design considerations and performance data.** Morris, W.S. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 102-106(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Described is a built and monitored residence in Santa Fe, New Mexico that utilizes a 400 sq. ft. thermosiphon air collector to heat a shallow rock bed under the entire floor of the 1850 sq. ft. house. Construction was completed in September, 1980, and intensive monitoring during January and February 1981 provided excellent data. The system appears to be performing exceptionally well and, as it is the first of its kind, may well serve as a model for future work.

33428 **Natural convection heating system: off-the-wall evaluation methods.** Cook, J.; Morris, W.S. (Arizona State Univ., Tempe). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 107-111(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

One day data collection results are described for supplementary monitoring of convective air collectors coupled with rock bin storage for house heating. This particular 100% passive heated solar house in the mountains of Arizona had been extensively monitored and previously reported. New information includes the performance of collectors and storage during changeable insolation. In addition, there are evaluations of the alternative techniques for monitoring leakage of dampers on delivery registers, an empirical technique for determining the thermal contribution of direct gain features, and subjective responses of owners to the quality of convective and radiative comfort. Warm is warm, said the owner-builders. Design recommendations for future systems are made and a testing method using a bag volumeter is described. Post-occupancy evaluation is strongly recommended.

33429 **Evolution of the air thermosiphon: toward production housing.** McIntosh, W.C. Jr.; Jones, M.M.; Cohlmeyer, J.C. (Mark Jones Corp., Santa Fe, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 112-115(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A second generation airsiphon underfloor system has been designed and 2 examples built for the speculative market, which achieve similar performance at much lower cost than a previous design. Examined are the development of the second generation underfloor system, its construction, control and dampering considerations, and dollar costs, leading to an exploration of its adaptability to the production housing market.

33430 **Passive solar D.H.W. performance with lower costs in freezing climates.** Sansone, P. (Solar Resource Service, Forest Grove, OR); Riley, B. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 116-120(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Simple, freeze-protected, passive solar domestic hot water (SDHW) systems for colder regions of the world are possible without sacrificing system performance or complicating the installation. The use of pumps, controls and solenoid valves result in high parasitic energy consumption. Indirect thermosiphon systems delivered performance comparable to indirect active systems operated under identical conditions when parasitic energy was considered. Standard hot water tanks can be retrofitted with jacket-on-tank heat exchangers without reducing system efficiencies below standard commercial solar tanks. Retrofitted exchange jackets performed well under thermosiphon and active collection modes. Efficient, low-cost, built-to-code systems are possible using standard water heater tanks, retrofit exchanger jackets, and standard manifold type collectors plumbed in a closed-loop configuration.

33431 Solar domestic hot water in Seattle: the relative effects of collector tilt and orientation of annual performance or Ma'am the roof is the least of your worries. Hogan, J.F. (Seattle Energy Office, Washington). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 121-125(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Current rules of thumb for the mounting of flat plate collectors for solar domestic hot water systems actually tend to discourage the installation of systems by specifying a narrow range of acceptable tilts and orientations. Computer simulation indicates that annual performance equivalent to 80% of the optimum achievable is possible in Seattle with wide variations in tilt and orientation due to the year-round nature of the load. For due south orientations it is almost impossible to achieve less than 80% of optimum performance is achievable with the majority of collector tilts. These simulations indicate that virtually all existing south-facing roof slopes are acceptable as is. But further, it also shows that the other half of Seattle roofs that face east and west with an average slope of 25° have great potential and should not be summarily dismissed as impossible candidates.

33432 Performance of two passive domestic hot water systems. Kelly, C.J. (Automation Industries, Inc., Silver Spring, MD). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 126-130(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The National Solar Data Network (NSDN) contains about 100 solar heating and cooling installations located throughout the United States. These installations are instrumeted and are monitored twenty-four hours a day throughout the year. A breadbox type heater and a thermosiphoning system from this network have been selected for this study. The breadbox system in Colorado is a single family passive dwelling which has two black painted tanks located behind a tilted, southfacing, glazed collection area. The thermosiphoning system is on an apartment building in Honolulu, Hawaii. The performance of these two systems is analyzed. Both systems perform well. Design features are evaluated and discussed.

33433 Comparative performance indices for solar batch water heaters. Stickney, B.L.; Aaboe, E.H. (New Mexico Solar Energy Assoc., Santa Fe). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 131-135(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A simple method is developed to allow direct comparison of various solar batch water heaters. Certain system variables must be determined by calculation or measurement which may vary with season. These include Thermal Efficiency of Collection, Tank R value, Collector Surface to Tank Volume Ratio, Clear Day Collection Period in Hours, System Cost, and Installed Solar Heatings Fraction (optional). These variables are used to compute any one of four performance indices. This method allows a valid comparison not only between various solar batch water heaters but between other types of solar water heaters as well. This system may be used by consumers or designers to choose the most cost and performance effective options.

33434 Side by side comparison study of integral passive solar water heaters. Burton, J.W.; Zweig, P.R. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 136-140(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This study compares the thermal performance of two identical vertical thirty gallon Integral Passive Solar Water Heaters (IPSWH) placed side by side for the past year at the Farallones Institute's Rural Center in Occidental, California. Actual variations include (1) glazing (number, type, and treatments); (2) tank treatments (flat black, selective surface, and transmissive insulation); and (3) interior collector surfaces (reflective, white and black). The relative thermal performance of each variation is compared. The results give basic information on IPSWH designs and materials previously unavailable. This information will assist the design of efficient and cost-effective IPSWH systems.

33435 Integral passive solar water heater performance. Bainbridge, D.A. (Passive Solar Inst., Davis, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 163-167(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Passive solar water heaters can be divided into two classes: systems in which the functions of heat collection and storage are separate (the thermosiphon flat plate systems), and systems with combined collection and storage - the integral passive solar water heater (IPSWH). IPSWH systems are much less widely known despite some inherent advantages, including simplicity, low cost, and resistance to freezing. The first solar water heaters widely used in the U.S were IPSWHs. They gradually fell out of favor because of night cooldown and tank corrosion. New materials and designs minimize these problems and promise to bring the IPSWH back into the forefront of solar activity. Described are recent IPSWH experiments evaluating new materials and designs. These are then correlated with work by other investigators to suggest the tremendous potential for IPSWH use around the world. The characteristics of IPSWHs make traditional solar system test procedures inadequate and a new test procedure for IPSWH system is proposed. The low cost of IPSWHs more than offsets their slightly lower performance and will make them the most cost-effective heater for many climates and uses.

33436 Interfacing a $10 calculator for data acquisition. Fowlkes, C.W. (Fowlkes Engineering, Bozeman, MT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 168-172(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Low cost instruments that can be used to make measurements around solar projects are of interest to homeowners and solar energy experimenters. For solar house performance monitoring it is important to know the total solar radiation intercepted by the collector and the total accumulated degree days. A number of excellent instruments are available which will integrate and display these quantities, but their cost may exceed the individual experimenter's budget. We have recently built a circuit which requires less than $20 worth of parts and uses a Texas instruments hand calculator, costing about $10, for a read-out. This device can be connected to a manufactured or home-made solar radiometer to accumulate and display total solar radiation. Another application of the same basic circuit uses two temperatur probes to effect a degree-day integrator for heat loads or for a wood stove integrator. The calculator alone can be used as an event counter to display pump cycles, door openings, etc.

33437 Short-term test for houses. Lau, A. (Southern Solar Energy Center, Atlanta, GA); Kedzierski, R. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 173-177(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Focus is on the development of a short-term test procedure aimed at quantifying those building parameters which are most susceptible to variance in the field. The test results will be used to more accurately predict long term building energy consumption. Testing is designed for unoccupied houses and a period of two to three days. The various tests are described and initial results from field testing are presented.

33438 Trombe wall test and simulation. Fanchiotti, A. (Istituto Universitario di Architettura, Venice, Italy); Vagliera, V.; Pacetti, M.; Sabetta, F. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 183-187(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Six test-cells have been obtained from an existing, two-story, heavy mass building, located near Urbino. Three couples of Trombe walls, with different thicknesses and materials, are being investigated. The building has been instrumented with more than 200 sensors, and a programmable data acquisition system. Experimental data have been gathered in the course of the past heating season and are presented, as well as the results from measures of system's thermal properties, taken both on site and in the laboratory. A computer code, based on a thermal network model, simu-

lates multiple zone passive buildings using hourly input data. The code is being tested and will be validated against the data from the test cells. A critical review of available methods to analyze the air flow in the wall channel is presented and it is shown that, as far as laminar flow is concerned, the flow and thermal fields may be adequately represented by the superposition of a Couette-like flow with the solution for a single hot vertical plate obtained by the self-similar method. The effect of thermal boundary conditions on the choice of the solution method is also discussed.

33439 **Preliminary optical performance study of glazing-reflector systems in breadbox water heaters.** Favard, G.J.; Nawrocki, A.D. (National Center for Appropriate Tech., Butte, MT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 188-191(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Planar reflectors are widely used to improve the performance of breadbox water heaters (BBWH). A generalized mathematical model was developed to simulate clear day, direct beam optical performance of glazing-reflector combinations. Software was developed using an HP1000 computer so that the reflector and glazing positions could be optimized for maximal heat gain in four BBWH designs. Other issues addressed were the effects of changing the reflector and glazing lengths and widths and seasonal adjustments vs fixed positons of the reflector(s).

33440 **Carpeted slab floors and comfort in direct gain systems.** Stevens, D.G. (Univ. of Auckland, New Zealand). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 192-194(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A townhouse having a carpeted concrete floor as the only thermal storage was found to be almost fully solar heated during the winter of 1980. the program TEANET was used to compare temperatures in bare and carpeted slabs. It was found that carpet tended to maintain higher temperatures within the slab and appeared to improve comfort conditions at cold times of the day but did cause larger fluctuations in internal air temperature. Subjective impressions support this conclusion, and the TEANET simulation is close to monitored results.

33441 **Development of facilities and methods for thermal performance tests of passive domestic hot water systems.** Geisheker, P.J.; Putman, W.J.; Bard, L.A. (DSET Laboratories, Inc., Phoenix, AZ). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 200-204(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

In a simultaneous test of six generic types of Domestic Hot Water systems conducted by the National Bureau of Standards, it was demonstrated that the most effective type of Domestic Hot Water System of the types tested was the passive thermosyphon. Several other generic types of passive Domestic Hot Water systems exist, including integral storage and phase changes types. There are, however, no standardized, accurate, repeatable, thermal performance tests for these passive devices. This is chiefly due to difficulties inherent in outdoor testing where widely variable ambient temperatures, wind conditions and insolation conditions are constantly affecting the testing of these devices. Facilities now exist at DSET Laboratories to provide accurate testing of these devices under totally controlled conditions including incident angles. Presented are proposed test methods and descriptions of facilities to test Passive Domestic Hot Water systems. Also provided is a review of other basic solar devices that are testable using similar methods and facilities.

33442 **Visualization by holographic interferometry of temperatures in passive components.** Cordier, A.; Durou, C,. (Universite Paul Sabatier, Toulouse, France). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 205-209(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A holographic interferometry apparatus foe investigating how convection acts in passive solar components is described and some examples are given of the results obtained. The optical system gives an interferogram which can be recorded on a photographic plate or on a magnetic tape through a TV camera. When an image is particularly attractive, it can be stored in the memory of a microprocessor. At the end of the experiment, the digitized image is transferred from the memory to magnetic tape for further treatment. Two kinds of information can be drawn from the holographic interferometry: the visualization of the field of temperatures in a transparent fluid through a set of isothermal fringes, and the values of the coefficient of convective heat transfer. (LEW)

33443 **Joint optimization of solar and superinsulation in a cold climate.** Duffield, J. (Univ. of Montana, Missoula). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 228-231(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Provided is an analysis of the joint optimization of passive solar, auxiliary fuels and superinsulation in new residential construction. A general analytic framework for selecting super-insulation strategies ranging from heat exchangers to insulation is developed. This approach is then applied to the specific issue of optimal wall sections for several Pacific Northwest sites. Wall sections are focused on because of the range of costs and technologies available, including double-stud construction and external rigid insulation.

33444 **Conservation and passive solar: a performance comparison in Washington State.** Straub, D. (Ecotope Group, Seattle, WA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 232-236(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Two prototype studies of residences in eastern (Yakima) and western (Seattle-Tacoma) Washington are summarized. It is found that conservation measures, even such marginal ones as insulating beyond the conservation levels set in the Building Energy Performance Standards, displace larger amounts of the auxiliary heating load than passive solar measures that go beyond moving windows to the south and the substitution of slab-on-grade floors for wood floors. The strategy of increasing window area increases losses while decreasing usability of solar gains. Conservation measures are accompained by an increasing multiplier to their benefits. If south window area is substituted for insulated wall a thermal optimum is reached between 100 to 150 sq. ft. of total south glass area. Heat loss reductions beyond the proposed Washington State code levels were more effective in reducing auxiliary load than additional passive solar measures. Standard methods of estimating annual loads using base 65°F degree days are found to be inadequate in calculating the auxiliary heating load for residences insulated better than the average existing housing stock. Passive solar analysis tools are required even though useful solar gains are found to average only 13 mmBtu/y.

33445 **Comparative analysis of conservation and passive solar strategies in multi-family residences.** McDonald, C.L. (Synergic Resources Corp., Seattle, WA); Tsongas, G.A. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 237-241(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The results of a study to compare the energy savings and cost effectiveness of a wide variety of conventional and new energy conserving measures and passive solar are presented. The annual energy requirement of the prototype residence with the various conservation and passive solar strategies was evaluated using the SUNCAT passive solar computer simulation program. The economic analysis was based on life cycle costs. The passive solar design approaches evaluated included: south orientation of structures with conventional glass distribution, reduced north windows plus a slab floor, direct gain, indirect gain and attached greenhouse. The sensitivity to the amount of solar glass and mass in addition to that contained in normal construction was determined. The performance of the systems was analyzed assuming both high conservation and conventional code construction. With high insulation levels and low infiltration construction, the performance of passive solar systems was found to be insensitive to a wide variation in south glass and thermal mass. In fact, substantial reductions in both south glass and thermal mass relative to design recommendations

do not seriously degrade the passive solar contribution to space heating. This means that passive solar benefits (heating and light) can be realized at a lower cost and in a greater number of structures if combined with extra energy conserving features.

33446 **Comparison between passive solar and superinsulation retrofits.** Quivik, F.L. (National Center for Appropriate Technology, Butte, MT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 242-245(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Concepts in energy-efficient retrofit have closely followed the shifts in energy-efficient new construction, from active solar to passive solar, to micro-load passive or superinsulation. During the summer of 1980 the National Center for Appropriate Technology retrofitted a brick bearing wall residence in Butte with a mass wall, passive solar configuration. Subsequent computer simulations indicate that the money spent on the passive solar retrofit would have been better spent on a superinsulation retroft. These simulations make a strong case for supenisulation as a general residential retrofit strategy.

33447 **Study of solar and energy conserving houses in California: preliminary results.** Newcomb, C.; Mahajan, S.; Shea, M.; Berg, B.; Hodapp, E.; Lombardo, C.; Mort, D.; Pond, B. (California State Univ., Sacramento). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 246-250(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A major effort to measure the performance of passive solar and energy conserving houses in California has been undertaken. The integrated data collection and analysis is described and implemented for this effort and some preliminary results are presented. The strategy makes use of the SERI Class B instrumentation and analysis and the two SERI CLASS C questionnaires. (1) Prior to these two collection methods a Class C⁻ effort was made which includes a telephone interview and collectiion of utility billing data from a very large sample of houses. Computer simulation of the houses chosen for Level C surveys using DOE 2.1 and CALPAS 3.0 has been integrated into the analysis in parallel with the collection of field performance data. A methodology for the collection and analysis of Level B data in the summer and swing seasons has also been developed and is discussed.

33448 **Analysis of an attached greenhouse in a low insolation northern climate.** Hastings, S.R. (Swiss Federal Laboratories for Materials Testing, Duebendorf). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 251-255(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A greenhouse attached to an end unit row house in a low insolation, cold climate is analyzed. A thermal network computer program, DEROB, was used to calculate the heating load of a base house without and with a greenhouse and the air temperatures of the greenhouse. Results are graphed for various design alternatives for two sample periods: one period is two low insolation, cold days and an intermediate day with no sun but less cold. The other period is three mild sunny spring days. Design alternatives are the number of layers of glass in combination with night insulation, the number of glazings versus insulated opaque greenhouse walls, and the addition of water thermal storage in conjunction with and without the greenhouse are graphed.

33449 **Performance studies of passive solar applications in the mid-west using blast, a large hourly calculation computer-based simulation program.** Bergeson, D.E.; Siminovitch, M.J.; McCulley, M.T. (Univ. of Illinois, Urbana). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 261-265(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Discussed is the program employed to develop a detailed understanding of the mechanisms of energy conservation and building design, emphasizing the dynamics of passive solar performance. General optimization methodology and specific examples representing some of our studies are included.

33450 **Direct estimation of the performance of passive structures.** (Boardman Energy Systems, Inc., Wilmington, DE). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 271-275(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Described is an analytical method of computing solar savings fraction for a given load-to-collector ratio of a passive structure in any location. The key to the computation is the use of an algorithm relating the pattern of clear days to the interaction of the thermal storage with transmittted radiation and heat load as well as a correlation of coefficient of performance with the total number of degree days in the heating season and the fraction of possible sun.

33451 **Passive solar retrofit analysis tool.** Leslie, R.P. (Rensselaer Polytechnic Inst., Troy, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 284-288(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A Passive Solar Retrofit Analysis Tool (PSRAT), which is intended to aid in determining the feasibility of retrofitting an existing building using passive solar techniques at the pre-design stage, is described in terms of its format and current development status.

33452 **F-load: a building heating load calculation program.** Beckman, W.A.; Duffie, J.A.; Klein, S.A.; Mitchell, J.W. (Beckman, Duffie and Associates, Middleton, WI). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 289-293(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

An interactive computer program that calculates monthly heating loads of buildings and the life-cycle cost of heating has been developed. The program is designed for residential and light commerical buildings. It incorporates passive heating features as well as conventional heating systems. The program is useful for determining the energy savings and economic benefits of various conservation measures. The input and output format is flexible to allow detailed specification of building shape, construction, orientation and location. The weather data base contains 244 North American locations. Additional data may be added by the user. The outputs are monthly and annual totals of energy loss from components such as the walls, roof, windows, etc. The economic analysis gives the life cycle cost of heating and includes the effects of fuel inflation rate, mortgage interest rate, market discount rate, and federal and state tax credits for energy conserving measures.

33453 **Simulation programs as design tools: an optimization technique.** Byrne, S.J. (Arizona State univ., Tempe). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 294-297(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A technique is described for optimizing any number of design parameters affecting the thermal performance of buildings or mechanical systems. The methodology requires executing any appropriate simulation program at specified values of the parameters. The results, either life cycle cost or energy consumption, are curve-fit; the minimum of the resulting function is then determined with a quadratic programming routine. The method is fast and accurate and makes efficient use of computer and programmer time. Three examples are presented along with user caveats and recommendations for further research.

33454 **M.E.P.A.: micro-computer erergy programs for architects.** Andersson, B.; Hidemark, B. (Royal Inst. of Tech., Stockholm, Sweden). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 298-302(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A set of fast, understandable, affordable micro-computer programs has been developed in Sweden to supply energy analysis information during the early stages of design of residential and small commercial buildings. The programs are for the use of the many architects with limited knowledge of energy or computers. The background of the problem is described, the approach to the development is discussed, and the characteristics of the resulting product are presented.

33455 Simple method for determining the average temperature, the temperature variation and the solar fraction for passive solar buildings. Winn, C.B. (Colorado State Univ., Fort Collins). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 303-307(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A method for determining the average temperature and the average daily temperature variation inside a passively heated solar building is presented. The approach is based on classical linear systems analysis techniques. Data for a single family residence for Albuquerque and Denver are presented.

33456 Graphic method for predicting temperature swings. Rosen, J. (South Mountain Design, Cambridge, MA); Moore, J.A. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 308-312(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This paper presents CALSWING, a graphic method for estimating the clear day indoor temperature swing of direct gain buildings.

33457 New quick-and-easy performance prediction method. Tsongas, G.A. (Portland State Univ., OR); Bolme, B.M. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 313-317(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

As a result of examining inconsistencies between the simplified annual and detailed monthly versions of the Balcomb SLR method, a new approach to quickly and easily predicting the performance of passive solar buildings has been developed. With inputs of only the south glass area and the non-solar building load coefficient (Btu/DD), the resulting solar savings fraction and auxiliary energy requirement are obtained from a single graph for a selected thermostat setting and design type (direct gain or thermal storage wall with or without night insulation) in a particular city. The graphs are produced using the solar load ratio monthly analysis method. They quickly show the influence of south glass area, the thermal integrity of the building (BLC), and night insulation without repeated detailed analyses of every particular building. One of the more surprising results that has become apparent is that for energy efficient buildings (e.g., BLC $<$ 5,000) without night insulation in Portland, increasing the south glass area can actually slightly increase the auxiliary heating costs and can reduce the solar savings fraction and even result in negative values. In fact, for such building, the size of the south glass is relatively unimportant, although an optimum size does exist. For buildings with larger building load coefficients and no night insulation, increasing the south glass area nominally reduces the auxiliary heating costs. These results are important in light of the further results that commercially installed night insulation may not be cost effective in Portland at this time. Such effects can be easily examined in other climates using this method.

33458 Annual load curves: a new design tool. Palmiter, L.; Straub, D. (Ecotope Group, Seattle, WA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 318-322(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Presented is an easy-to-use method for predicting the annual heating load of conventional or direct-gain passive solar homes. It is presented in both graphic form and in an analytic form, suitable for use with a pocket calculator. Although the method is general, the present discussion is confined to the Seattle and Albuquerque climates. Use of the method requires only a few minutes, once a heat loss calculation has been done. It allows the user to quickly estimate the potential benefits of increased solar area, increased thermal storage, and better insulation. The analytic form leads to a simple equation for economic optimization of the insulation of the home.

33459 Point system: a simple design tool. Gruber, J.O.; Fanning, M.W.; Oswald, R.L. (Total Environmental Action Foundation, Inc., Harrisville, NH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 323-327(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Currently available design tools for passive and active solar system are limited to either overly simplistic rules of thumb or costly time consuming, analysis requiring technical expertise. The procedure for developing a quick, simple and accurate method that will fill the gap between these existing design tools is presentd here. The resulting point system is designed to be used by non-technical persons including builders, homeowners, and prospective homebuyers. With its reasonable level of accuracy and ease of use, it is anticipated that a point system will also be widely used by architects and designers during the preliminary design of residential buildings. The steps involved in developing this type of simple tool from detailed simulation techniques are explained. Two case studies are then presented.

33460 Tabular data for the un-utilizability passive solar design method. Klein, S.A.; Monsen, W.A.; Beckman, W.A. (Univ. of Wisconsin, Madison). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 328-332(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Un-utilizability design method for direct-gain systems is presented in a manner which minimizes computational effort. This is accomplished by the use of tables containing the monthly-average daily radiation on vertical surfaces, the monthly degree-days at various base temperatures and the solar radiation utilizability. Step-by-step instructions and examples are included to show how these tables are used in the Un-utilizability method to evaluate the auxiliary energy consumption.

33461 Passive solar retrofit: comparisons of computer simulated performance with monitored data. Lenchek, T. (Balance Associates, Seattle, WA); Magee, T. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 338-342(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Comparison are given of three designer-oriented methods of predicting energy requirements of a passive solar residence with the residence's actual monitored results. The paper will discuss the passive solar system itself, its monitored performance, the type of monitoring system used, and will describe the computer models and their simulated results.

33462 Passive solar performance fraction relative to the actual building. Abrams, D.W. (Southern Solar Energy Center, Atlanta, GA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 343-347(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Solar fractions, particularly the Solar Savings Fraction or SSF, have become an inappropriately popular measure of the performance and desirability of passive solar systems. While the SSF and other fractions have been developed primarily as a means of estimating auxiliary heating energy consumption, they are frequently interpreted as independent figures of merit. The building community and the home-buying public usually incorrectly assume the SSF to be the fraction of a particular home's gross heating energy requirements supplied by the passive system. This definition of solar fraction might be called the the Common Solar Fraction or CSF. Interpreting an SSF value as a CSF value leads to a greatly understated perceived value for the passive system. This paper discusses presently-used solar fractions and defines the Common Solar Fraction. Rule-of-thumb CSF estimation methods for 124 sites and procedures for converting SSFs to CSFs are presented. CSF/LCR tables are included to three sites.

33463 **Performance assessment of a utility-sponsored passive solar home program.** Carr, R.S. (Pacific Power and Light Co., Portland, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 348-352(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The methodology and results of a study conducted to assess the effectiveness of design guidelines developed for a utility-sponsored passive solar home program are presented. The program will be implemented in a diverse geographic and climatic reion covering six states in the Pacific Northwest. The design guidelines presented are prescriptive standards which combine superior conservation levels and passive solar features in an energy-conscious design. The methodology used in the study compares the seasonal heating requirements of the passive solar home to that of an equivalent, conventional home built to code specifications. The concept of a total savings fraction is introduced which includes savings derived from both solar and conservation features. The results of the study are presented, which indicate that the total savings achievable for homes built to the guidelines will exceed 50 percent of the energy used for space will also require smaller backup heating systems, resulting in a capacity savings approaching 20 percent.

33464 **Evaluation of the Los Alamos Scientific Laboratory's residential passive solar methods applied to small commercial buildings.** Arnoth, D.E. (Donald A. Krueger and Assoc., Albuquerque, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 353-357(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This study evaluates the applicability of the Analysis Methods for Passive Solar Heating Systems to small commercial buildings (less than 5,000 square feet). The performances of three passive solar commercial buildings are analyzed. Comparisons are made between the predicted and actual energy consumption patterns. There was a close correlation (less than 7% difference) between the predicted yearly and the actual yearly solar savings fraction when the internal heat generation and thermostat schedule were properly accounted for. The evaluation process diagramed in this study will be of use to others validating passive solar methods applied to commercial or residential buildings. From this analysis, implications are drawn for future use of these calculation procedures by energy conscious designers of commercial buildings.

33465 **Validation of CALPAS3 computer simulation program.** Atkinson, B.A.; Barnaby, C.S.; Wexler, A.H.; Wilcox, B.A. (Berkeley Solar Group, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 358-361(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Discussed are results of validation research on CALPAS3, a building energy analysis simulation program. Computer-predicted temperatures and energy requirements have been compared to analytical calculations, to data from an occupied house, and to data from a passive test cell. The results of this work show that CALPAS3 agrees very closely with analytical values and exhibits excellent qualitative agreement with real data. Further effort is underway to identify the sources of disagreement between program predictions and observed values.

33466 **Comparison of measured and predicted thermal performance of passive solar residences.** Fanning, M.W. (Total Environmental Action, Inc., Harrisville, NH); Temple P.L.; Duffy, J. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 362-366(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Data from forty-one passive solar residences were used in the FCHART/SLR design process to predict annual space heating auxiliary use and solar savings fractions. Those results were compared with actual performance estimated actual auxiliaries was found, there was a large random error. The FCHART/SLR predictions tend to be conservative in that they over-predict space heating auxiliary by 60%, on the average, and under-predict the solar savings fraction.

33467 **Design methodology based on climate characteristics.** Brown, G.Z. (Univ. of Oregon, Eugene). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 372-376(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A method is described for characterizing climate in terms of appropriate architectural response in order to develop climate-sensitive design criteria. It is shown that the amount of time during which thermal comfort is achievable in unenclosed spaces can be increased significantly. Updated conmfort zone definitions and climate pattern recognition techniques are applied, and information and presentation techniques are developed several levels of generality, corresponding to levels of detail encountered in the design process. (LEW)

33468 **Controlling the accuracy of solar radiation data from a low cost, 30 station network.** Fowlkes, C.W. (Fowlkes Engineering, Bozeman, MT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 377-381(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

For the past four years in Montana we have operated a network of 30 low-cost solar radiation measuring instruments. At this point the data base consists of over 40,000 data days. The basic element of data stored on the computer is the half-hour average, radiant intensity on a 60° tilted surface. The sensors are silicon cells mounted on a flat plate and connected to strip chart recorder. Maintaining the accuracy and continuity of experimental data is a difficult task due to the large number and state-wide distribution of the sites. Since the instruments are home-made, their performance must be carefully and scientifically documented to relate the radiation data to accepted calibration standards. Specifically, the results of (a) NOAA calibrations, (b) side-by-side pyranometer comparisons, (c) clear day theoretical comparisons and (d) comparison with independent measurements from the National Solar Data Network are discussed. The results of each approach in assessing accuracy and maintaining data integrity of the SIMM instruments is discussed.

33469 **Climatological sundial.** Scofield, S.H. (Military Airlift Command Headquarters, Scott AFB, IL); Moore, F. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 382-386(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A sundial has been developed for both preliminary site analysis and building model analysis. As such, it can provide the following functions: (1) determine December 21 and June 21 solar obstructions at various hours, (2) allow a scale model to be oriented to a light source to predict shadow patterns and sun penetration at various times and days of the year, and (3) provide a model sighting method allowing the designer to locate his eye in the sun's position relative to the model. This allows direct visual assessment of exposed glass and internal mass at various times. Presented are: (1) methodology of applying Olgyay's overheated period/sun path diagram to the sundial, and (2) a discussion of the sundial's potential, and limitations of this methodology in preliminary design of passive buildings.

33470 **Degree-days for variable base temperatures.** Erbs, D.G.; Beckman, W.A.; Klein, S.A. (Univ. of Wisconsin, Madison). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 387-391(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A method developed for the estimation of degree-days above or below any base temperature is described. Long-term hourly SOLMET data for nine U.S. locations are used to test the major assumptions employed. Although some disagreement is noted, the method is also presented, and this simplification is shown to result in comparable accuracy to the original method.

33471 **Fine tuning solar access: calculators and computers as design tools.** Mawson, K.H. (City of Albany, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 392-396(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Exactness in sun angles and shadow patterns is a worthwhile and obtainable objective. The required formulas and the uses of a calculator and computer in applying those formulas are discussed.

33472 **Design days for passive solar.** Stevens, D.G. (Univ. of Auckland, New Zealand). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 405-408(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

There is a need for typical design days to shorten the time taken to evaluate passive designs with programmable calculators. The invention of design days from simple noncoincident meteorological records and how these were combined into synthetic weather sequences is described. Appreciation of the errors inherent in the assumptions led to extraction of short typical real weather sequences from climatic tapes. The sequences are independent of a reference building and may be used to evaluate any passive solar building.

33473 **Perception of thermal comfort.** Guerin, D.A. (Miami Univ., Oxford, OH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 417-418(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Human perception of thermal comfort in the built environment is briefly outlined.

33474 **Impact of consumer/client issues on passive solar design.** Balcomb, S.A. (Passive Solar Associates, Santa Fe, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 419-422(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The ultimate test of any passive solar building's performance is user satisfaction. Some of the issues which affect the user's perception of passive solar are discussed. Results of questionnaire and interview surveys of both teachers and students in two Santa Fe passive solar schools are presented. Particular attention is given to perceptions of daylighting, and to both visual and thermal comfort. The importance of factoring results of post-occupancy surveys into the design of the next generation of passive solar buildings is emphasized.

33475 **Sunspaces in th rain belt.** Merkle, D.J. (SunWorks, Portland, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 423-425(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

People who work in the solar industry tend to become so intensely involved in thermal performance and economics that they tend to lose sight of what's on the mind of the consumer. Because communication of consumer priorities is crucial, because the public need further education regarding the important advantages of installing solar systems, and because contractors demand concrete facts to present to potential solar buyers, it seemed useful to quantify some of the perceptions of solar users and to compare them to the perceptions of the solar industry. A detailed questionnaire was given to 50 sunspace owners in metropolitan Portland and surrounding areas to determine how they prioritized the advantages of their passive solar systems, and how they would change their investment if they had the opportunity to begin anew. The data were compiled to present a user's point of view regarding both psychological and economic return on investment. Conclusions are drawn of what these responses mean to a retailer, contractor or solar designer.

33476 **Critical users' manual for passive solar homes.** Loftness, V. (INTERATOM, Bergisch, West Germany); Boese, F.K.; Bartos, S.; Tombazis, A.; Mouzakis, J. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 431-435(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Nine illustrated users manuals have been produced for the 34 families living in the passive solar homes of the Lykovrissi Solar Village - a joint Greek and German project to provide energy efficient and solar assisted housing for 431 low income families. The conclusions drawn from the creation of these manuals and a sample of their contents is included here.

33477 **Humidity fluctuations in solar greenhouse-residences.** Davis, M.A. (Clemson Univ., SC); Harrison, R.E.; Godbey, L.C. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 436-440(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The thermal performance of solar greenhouse-residences is well-documented. Data concerning temperature fluctuations and horticultural yield are obtainable and provide a clear picture of greenhouse-residence temperature extremes. However, both human comfort and plant growing environment are not dependent upon temperature alone. Air movement, radiation, and humidity are other criteria that can influence thermal comfort and growing conditions. The effect a vegetable peoducing greenhouse has on thermal comfort of an adjoining residence is illustrated in terms of temperature and humidity. An analysis of dewpoint conditions will further indicate the effect of moisture within the individual components. A solar greenhouse-residence with an integrated heating collection and distribution system exhibited higher internal humidities than conventional housing. The greenhouse exhibited greater diurnal swings than the adjoining residence. Transfer of moisture occurred from greenhouse to residence and caused infrequent dewpoint levels in the house. An analysis of two such buildings indicated a higher average relative humidity in the solar greenhouse-residence over conventional housing in the southeast.

33478 **Test results: textiles selected for direct gain passive buildings.** Guerin, D.A.; Butler, S.L. (Miami univ., Oxford, OH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 446-449(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Upholstery textiles that are commercially available to residents of passive solar homes were tested to determine the sunlight resistance and thermal conductivity properties. Those textiles with the highest rating for sunlight resistance can then be recommended for use in direct gain passive solar buildings.

33479 **Parametric study of a passive solar-heated house with special attention on evaluating occupant thermal comfort.** Emery, A.F.; Heerwage, D.R.; Kippehan, C.J.; Waki, T. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 450-454(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A parametric study has been conducted of passive heating devices that are to be used to provide environmental conditioning for a single-family house. This study has been performed using the thermal simulation computer program UWENSOL. Climatic data used in this analysis were for Yokohama, Japan, which has a subtropical humid climate similar to Washington, D.C. (in terms of winter air temperatures and useful radiation). Initial studies considered the use of different wall thicknesses, glazing types, and orientations for a Trombe wall and alternate storage quantities for a walk-in greenhouse. Employing a number of comparative parametric studies an economical and efficient combination of devices was selected. Then, using a computer routine COMFORT which is based on the Fanger Comfort Equation, another series of parametric analyses were performed to evaluate the degree of thermal comfort for the occupants of the house. The results of these analyses demonstrated that an averaged Predicted Mean Vote of less than 0.3 from a thermally-neutral condition could be maintained and that less than 10% of all occupants of such a passively-heated house would be thermally uncomfortable.

33480 **Roosevelt Parkside: low income passive solar housing.** Calthorpe, P. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 457-461(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The design for the Roosevelt Parkside development is built around four general goals: respect and enchance the urban context, serve the social needs of potential users, maximize energy conservation, provide affordable housing. Each of these goals generated a number of concepts which were incorporated into the design, in many cases reinforcing one another. The project design results in a mix of townhouses, apartments, condominiums and commercial space. The site plan is a very rich and exciting one, incorporating: total 107 housing units, density of 43 units per acre, 4600 s.f. of commercial space, 115 total on site parking with only 46 surface, 56,000 s.f. of open space developed into greens, paths, and private yards representing 51% of the site.

33481 **Residential solar retrofit and energy conservation potential in an urban area.** Camarata, S.J. Jr.; Cutting, S.A. (Utah Solar Advocates, Logan). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 462-466(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

An existing residential area in Salt Lake City, Utah, is analyzed in terms of housing stock, demographic and energy components. Residential energy audits and a solar potential analysis were performed. Regulatory land use documents were reviewed to determine barriers to the use of solar applications. Correlations between the data derived from the analyses were completed in terms of the potential for solar energy and energy conservation applications.

33482 **Commercial potential of passive solar energy technologies in the third world.** Lillywhite, M.; Lillywhite, L. (Domestic Technology International, Inc., Evergreen, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 484-488(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Factors are examined that determine the commercial viability of a number of renewable energy technologies when they are introduced to Third World countries. The nature of the technology and its applications are discussed in terms of its perceived value to lesser developed countries (LDC) and/or customers. The analysis is done from both the developed and the developing countries' view points, assuming that there must be technical cooperation between these two actors to establish a commercial technology transfer mechanism. The primary emphasis is placed on commerical considerations, however due to the very nature of most LDCs, the impact of cultural, social, economic and climatic conditions define a very different market environment than most western businesses are familiar with. The authors feel that the ability to understand and adapt to the complexities of this non-traditional market situation is the key to successful Third World renewable energy technology commercialization. The technologies considered are: (1) consulting, (2) passive solar heating and cooling, (3) solar ponds, (4) evaporative and cold chain coolers, (5) solar food dehydration, and (6) biomass conversion.

33483 **Approach to teaching calculation procedures for passive design.** Ubbelohde, M.S. (Tulane Univ., New Orleans, LA); Brown, G.Z.; Reynolds, J.S. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 494-497(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Described is the development, testing and revision of a workbook, Design Procedures for Daylighting, Passive Solar Heating and Cooling, which emphasizes the integration of a set of calculation procedures with the building design process.

33484 **Laboratory experiments in building climatology.** Benton, C.C.; Akridge, J.M. (Georgia Inst. of Tech., Atlanta). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 503-507(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The University of Pennsylvania has recently coordinated the development of a set of curriculum resource materials addressing passive solar design. Eleven schools of architecture have contributed to this effort by developing packages on specific topics. The College of Architecture at Georgia Tech has developed a series of laboratory exercises involving basic building technology. This series of lab experiments provides introductory, hands on experience with topics ranging from thermal comfort to the thermophysical properties of materials. Each exercise is described in addition to the pedagogical role they would play in an architectural curriculum. A detailed example is provided in the Solar Transit, a user built tool for the analysis of a site's solar potential.

33485 **Big buildings and passive solar energy.** Kremers, J.A. (Kent State Univ., OH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 511-513(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Big buildings require that designers examine the program carefully and thoroughly. Internal heat and program cycles are important issues. Daylighting can be an effective solar design responses in reducing energy consumption and increasing the potential for solar heating contribution. Design calculation methodologies must be developed to address these types of building issues.

33486 **Passive solar construction handbook.** Levy, E.; Evans, D.; Gardstein, C. (Steven Winter Associates, Inc., New York, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 514-518(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A Handbook of construction details, using commercially available products, has been developed for passive solar residential applications. The Handbook contains over 150 working-level details, in-depth discussions of basic passive solar principles and systems, appropriate Rules of Thumb for design and sizing, a series of relevant case studies, in-depth reviews of specific passive construction materials, and an extensive bibliography. The Handbook is intended to effectively bridge the gap between the technical state-of-the-art in passive solar design and standard practice in single-family residential construction.

33487 **Texas solar greenhouse '80 statewide program.** Carlson, J.H. (Texas Energy and Natural Resources Advisory Council, Austin). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 519-523(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Texas Energy and Natural Resources Advisory Council (TENRAC) determined in the latter part of 1979 that a need existed in the State of Texas to disseminate information on attached solar greenhouses and to assist in the training of nonprofit organizations in the construction of attached solar greenhouses. The approach TENRAC used in its statewide solar greenhouse training program is explored and the potential of such a program is examined.

33488 **Passive Solar Masonry Workbook.** Eley, C. (Charles Eley Associates, San Francisco, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 524-528(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Passive Solar Masonry Workbook is a single source reference for builders, designers and developers. It presents practical information on passive solar fundamentals, marketing, climate and cost/benefit analysis. The Workbook also presents an easy-to-use correlation method for predicting the performance of a direct gain passive solar house. The correlation method is based on three parameters: a Reference Heat Loss Coefficient (UREF) which depends on the size of the house and how well it is insulated, the climate conditions of the region, and the area of south glass.

33489 **Passive solar energy education and training courses.** Meyers, A.C III. (Inst. of Basic and Applied Research, Inc., Ames, IA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 529-533(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Passive solar energy education and training courses have been developed as a part of an integrated program of curriculum materials development for scientific, engineering, architecture and technical training of professional personnel for the solar energy industry and market place. The work done to date is reported and the core course and a passive introductory sequence developed and tested are described.

33490 **Portfolio of passive solar homes designed, constructed and marketed by New York State Builders/Developers.** Barron, J.J.; Niles, J.E.; Cole, W.J. (New York State Energy Research and Development Authority, Albany). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 537-541(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The New York State Energy Research and Development Authority (ERDA) is sponsoring a design and build competition for builders/developers. The purpose of the project is to stimulate interest and competition among tract builders and developers to market energy conserving passive solar homes. The program includes seven builders and their Design Teams involved in the process of designing highly marketable passive solar single family residential buildings. The price range of houses being designed are from the low $50,000 to $130,000 range. The purpose of the program is to develop a portfolio of tract type passive solar homes and to make those designs available to builders and the public. The type of designs developed are simple, efficient and traditional. Great attention has been taken by the designers to facilitate the needs of the builders from the point of view of the marketing limitations, their construction techniques, their performance and their reproducibility. Each of the designs are now in the planning stages for construction and should be built for next heating season. It is anticipated that ERDA will prepare a portfolio presenting the designs and that the actual construction drawings and specification packages will be made available to builders and the general public. The prominent design features which characterize these homes and the logic of their selection are presented.

33491 **Solar Spec.** Nicklas, M.; Bailey, G.; Johnson, B. (Innovative Design, Inc., Raleigh, NC). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 547-551(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Solar Spec is a passive solar technical assistance program for the speculative home builders of N.C. The program was initiated in order to promote the implementation of passive heating and cooling techniques by providing free one-on-one consultations with the builders. The major goal of the program is to educate the spec builder by providing a plan modification service in which a set of the builders stock plans are reviewed with the contractor and changes suggested that will improve the energy efficiency of the home design. The daily functioning and organization of the program, the assistance provided, profiles of the participants, the success of the program to-date, and information that may be useful to other organizations interested in conducting similiar projects are given.

33492 **Low cost passive solar townhomes.** DeWitt, S.C. (Solar Architecture Associates, Boulder, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 570(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Klaus Daily townhomes were designed for SERI's Denver Metro Homebuilders Program. The twelve units utilize a two-story solarium and mass wall to heat their south zones. A fan-circulated rock bed under the floor slab provides heat for the north zone. This project is exemplary because the initial 1250 square foot units were sold for $57,500. This was the lowest cost unit which was designed and built for the program.

33493 **Marketable passive solar housing design for merchant builders.** Leach, J.W. (Dowing/Leach Architects, Boulder, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 578-580(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

While many fine custom solar homes are being designed and build throughout the country today, the majority of America's new housing is being built by merchant builders who build on speculation or to order from predesigned model homes. Merchant builders have traditionally been slow to adapt new concepts such as passive solar until they have been well proven in the houing market. This paper deals with the integration of passive solar design with the marketing, production, and affordability considerations of the merchant builder. Experience generated from designing solar housing projects located in Boulder, Colorado, and three model homes for merchant builders through the SERI Metro Denver Home Builder Program is used to suggest recommendations with respect to designing passive solar homes for merchant builders.

33494 **Not everyone's a scientist - not everyone's a bureaucrat.** Andron, S.R. (FmHA Architect, Raleigh, NC). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 584-586(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Results are discussed of an effort to finance and monitor passive solar houses in North Carolina, emphasizing mistakes made by homeowners in using solar design features, and discussing education of decision-makers through the example of the monitored homes. (LEW)

33495 **Building and marketing passive solar homes.** Leach, J.W. (Downing/Leach Arhitects, Boulder, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 587-589(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

For passive solar to reach its potential as a force in dealing with the nation's energy problems, it must be adapted by the mainstream of the housing industry. This will only happen if passive solar can become part of the answer to the real issues concerning marketability and affordability that face the housing industry in the 80's. This paper discusses the forces which can be brought to bear to expedite the movement of passive solar into the housing industry and how passive solar can become an instrumental part in creating marketability in housing. It describes design concepts and marketing techniques that are compatible with passive solar.

33496 **Massachusetts Multi-Family Passive Solar Program: recent activities and findings.** Rousse, R.E.; Noble, E.C. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 590-594(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Passive solar features are being put into new multi-family housing for the elderly throughout Massachusetts. The Multi-Family Passive Solar (MFPS) program provides design and technical assistance to housing agencies, project architects, and engineers. To date, awards totalling almost $2 million have been made to 19 projects including almost 500 passive solar heated apartments. Thirteen are under construction and several are substantially complete. An extensive data base on incremental costs has been developed, and it is found that standard cost estimating techniques may substantially overestimate conservation and passive solar costs. It is indicated that if mechanical systems are intelligently sized to reflect improved conservation features, resultant cost credits may more than offset supposed incremental conservation costs. (LEW)

33497 **Obermeyer headquarters and warehouse.** Hagman, J.T.; Graybeal, D.L. (Copland Hagman Yaw Ltd., Aspen, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 597-601(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A new unique solar heating system best described as a hybrid, convective, selective surface Trombe wall has been designed into an international corporate headquarters warehouse and has proven to be significant, both economically and in energy con-

servation, as well as being an aesthetically pleasing solution for the building. The Sport Obermeyer Headquarters and Warehouse complex in Aspen, Colorado is located at an elevation of 8,000 feet with 8,948 heating degree days, with minimal cooling requirements and a wide diurnal temperature swing.

33498 **Solar retrofit of Vintage Auto Parts, Woodinville, WA.** Lerner, R.A. (Northern Sun, Lynnwood, WA); Lenchek, T.E. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 607-610(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Commercial warehouse buildings may be more effectively retrofitted by solarizing than by insulating. The use and construction of these buildings contribute to the attractiveness of the solar option. The costs and benefits of a variety of conservation and solar options are reviewed and found to vary widely. The design, construction and performance of a vertical wall collector retrofit is described in detail.

33499 **Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting.** Aitken, D.W. (San Jose State Univ., CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 611-615(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A brief historical and technical overview is given of the air flow windows as developed and applied for improved building thermal performance, as well as those with between-pane venetian blinds when utilized for solar heat collection and daylighting. The technical considerations presented include the advantages, efficiencies, air flow rates, and reported operational experience. Bibliographic resources are cited, and illustrations drawn from those references are included. The value of air flow windows in promoting substantial building energy savings is revealed form the work presented.

33500 **Passive solar opportunities in commercial buildings: technical insights and a model for professional development.** Fisher, W.J. (Rittelmann Associates, Washington, DC); Shibley, R.G. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 616-620(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The purpose of this paper is to highlight review and analytical procedures learned from the DOE Passive Commercial Design Assistance Program. This first pilot program investigates the potential contribution of passive technologies to the energy requirements of commercial buildings. The program recognizes passive solar opportunities of commercial buildings. The review process compensates for the lack of intuitive knowledge of interpreting major energy requirements with passive solar opportunities. Understanding of energy performance and economic issues is needed. Little quantifiable data exist about how passive solar elements affect energy end use.

33501 **Windows as cost effective solar collectors.** Seppanen, O. (EKONO Inc., Bellevue, WA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 621-625(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

In the system described, a window structure is formed as a pair of spaced panels with plenum in between. Within the plenum is a set of blinds which can be in the form of conventional venetian blinds. At the lower part of the inner panel there is a lower air intake opening so that room air enters, passes upward through the plenum, and through an upper outlet opening to be recirculated in the building or discharged to outside atmosphere. Advantages of such a system are discussed. Results are given of system evaluations done both by brief manual calculations and by computer analysis. Applications of the system in a Seattle house and in European office buildings are described. (LEW)

33502 **Economic analysis of selected passive solar commercial buildings.** Hart, K.; Gordon, H.T.; Whiddon, W.I.; McIsaac, I.S. (Booz, Allen and Hamilton, Bethesda, MD). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 631-635(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Focus is on the economic performance of passive solar commercial buildings. Preliminary indication are that econimic performance in passive solar commercial buildings is likely to have a significant affect on discussions of the general viability of the technology as well as plans for further basic research and development. To date, there is no agreed upon set of definitions or methodologies for doing economic analysis of passive commercial buildings. A first cut analysis is presented of ten buildings in the program using design estimates of cost and performance in order to get a preliminary sense of the likely results and to surface important issues for discussion before proceeding with analysis of actual performance data.

33503 **Overview of designs from the DOE Passive Commercial Buildings Program.** Kurkowski, T.L. (DOE Chicago Operations Office, Argonne, IL); Ternoey, S.E. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 636-640(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The U. S. Department of Energy (DOE) Passive Solar Commercial Building Program required designers to analyze conventional building predicted energy loads prior to the start of the passive solar design. Three examples are presented to show how designers translated the statement of the building energy problem to a design which solved that problem. Conclusions are extrapolated to other buildings.

33504 **Optimum conservation in direct gain homes: a new freedom for designers.** Palmiter, L. (Ecotope Group, Seattle, WA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 641-645(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The economic merit of adding direct gain passive solar features to homes which have optimal insulation is discussed. The effect of internal gains, neglected in prior studies, is included. The discussion is limited to two climates: Seattle and Albuquerque. The cost of insulating the windows is counted as a conservation cost. the economic performance of passive solar systems is very sensitive to this cost. In the Seattle climate, there is no economic benefit from passive solar unless the cost of insulating the windows is $1/R-sqft or less. For the Albuquerque climate, life-cycle costs are substantially reduced by adding passive solar features. Using a 1500 square feet of south glass as the basis of comparison, the addition of window area and thermal mass in Seattle produces a life-cycle cost reduction of $146 to $952. For Albuquerque the savings are $798 to $1546. These values assume that the addition of thermal storage is without cost. Only heating loads are considered in this study.

33505 **Passive solar in the city: 93 townhouses near Portland, Oregon.** Shea, M. (Evenson Lundgren Larson and Monaghan, Architects, Portland, OR). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 653-657(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Two speculative condominium projects using passive solar space heating are under construction. Casa del Sol, with 58 townhouse units, uses a direct gain and mass wall hybrid system. Crystal Park, with 35 townhouses, uses direct gain and greenhouses. The dwellings are of wood frame construction with brick and water providing thermal storage. Both projects stand at 10 units per acre within the city limits of Lake Oswego, which shares a common border with Portland, Oregon.

33506 **Utility impact and thermal performance of the Franta residence.** Franta, G. (Solar Energy Research Inst., Golden CO); Connolly, M.; Winn, B. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 664-668(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Franta residence uses a unique combination of passive and hybrid solar applications to reduce total energy use and peak energy demands for heating, cooling, and lighting. The residence, occupied by a family of three, is integrated into the neighborhood of a Denver suburb. The design program objective called for the residence to use less than 800 kWh per year to heat and cool the all-electric residence. This goal has been more than achieved by the residence using only 153 kWh of heating and cooling electrical energy for the first half year of operation (November 1980 to April 1981). Further objectives were to produce an aesthetically pleasing design, to maintain thermal comfort levels, and to have a minimal impact on the lifestyle of the occupants.

33507 **Towards a bioclimatic architecture.** Gerber, M. (Climat, Energie, Architecture, Les Perdrigals, France). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 669-671(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Observations are made recent events in the energy development of France. It is shown that industrialized construction was promoted without the necessary knowledge and experiences. Three projects illustrate an evolution which can lead to new architectural expressions.

33508 **Hybrid solar application in a demonstration home for the N.A.H.B.** Leach, J.W. (Downing/Leach Architects, Boulder, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 672-674(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The NAHB Energy Saver Home built in 1980 in Boulder, Colorado, is one of ten different energy-conserving homes built under a demonstration program for the National Association of Home Builders. It incorporates a unique job-built active solar system that is carefully integrated with passive solar features on the home to create an attractive and marketable hybrid solar application. This paper describes and illustrates the design of the system, expected performance of the solar system, and the initial public reaction to the design. The home is presently occupied and being monitored.

33509 **Jersey Devil architecture: there's more to it than a low utility bill.** Badanes, S. (Jersey Devil, Stockton, NJ). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 675-679(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Sections, photographs, and site plans are presented for six unique house designs incorporating superinsulation, direct gain, and earth sheltering. (LEW)

33510 **Results of the Washington Passive Solar Design/Build Competition.** Nylen, N. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 680-684(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

In an effort to encourage the design, construction, and marketing of moderately priced passive solar homes in Washington state, the Western Solar Utilization Network (Western SUN) recently sponsored the Washington Passive Solar Design/Build Competition. The competition drew an overwhelming response from designers and builders throughout Washington. Thermal performance of the designs was evaluated by a technical review committee, and final selections were made by the Competition Jury in accordance with the following criteria: perceived market acceptance, thermal performance, cost effectiveness, simplicity of design and operation, and completeness of the passive concept. Design contract awards totaling $50,000 were made available to winners in four categories, including single and multi-family, new and remodeled residences. In order to receive the award in its entirety, winning design/build teams are required to construct their design by April, 1983. As a result of the competition, a great deal was learned about the attitudes and knowledge of professionals and the general public regarding the use of solar energy in Washington state. Among the points that will be highlighted in this paper are the following: (1) a design/build competition is an effective vehicle for promoting solar energy among professionals in the housing community as well as the general public; (2) passive solar techniques can contribute significantly to the heating and cooling needs of residential housing throughout the state of Washington; (3) there is a great deal of interest and talent among the designers and builders of solar residences in Washington; and (4) follow-up activities, including the promotion of winning designs, the systematic collection of performance data, and identification of the major obstacles confronting designers and builders of solar homes, are critical to the success of the program in achieving both its short-term and long-term goals.

33511 **Architectural/solar design methodology.** Crawford, S.J. (Thorp/Crawford and Associates, Estes Park, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 685-689(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The passive solar residences described are all located in the vicinity of Estes Park, Colorado, approximate elevation 7500 feet. A variety of passive solar components and systems have been used in these residences including; direct gain, attached sunspaces, trombe walls, atriums, earth-sheltering and super insulation. Each review will discuss how and why the passive solar system was chosen to be incorporated into the design of the residence. The solar percentages shown are based on Solar Load Ratio calculations for 7925 degree days and 40 degrees north latitude insulation adjusted by our own measurements.

33512 **Design implications and potentials of passive solar heating in higher density communities: the Lykovrissi Solar Village.** Loftness, V. (INTERATOM, Bergisch Gladbach, Germany); Boese, F.K.; Tombazis, A.; Mouzakis, J. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 690-694(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Carefully analyzed building density, massing, and orientation become critical if solar access to the building is to be maintained. Even more carefully thought out building organization and room planning is critical if solar access to the apartment is to be maintained. Finally, careful material and component selection and placement, as well as window control system design is critical if solar access (heating) for the individual is to be maintained. The prerequisite guidelines necessary to ensure this completed solar access were established for the design of the Lykovrissi Solar Village now under construction near Athens. Fulfilling a cooperative agreement of 1978 between Germany and Greece, a community of rowhouses and three-to-six story multi-family units have been designed to provide energy efficient and solar assisted housing for 431 low income families, with a clear perspective on comparing solar systems for future subsidized housing.

33513 **Integrating passive solar systems with exciting architectural form.** DeWitt, S.C. (Solar Architecture Associates, Boulder, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 695-697(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The paper describes three solar residential designs which utilize the concept of zoned-passive solar heating and cooling. This concept is to supply each zone of a building with enough glass aperature and storage mass to reduce the need for auxiliary conditioning by a predetermined amount. The primary design objective was to integrate the zoned passive approach with interesting exterior forms and interior spatial arrangements.

33514 **Integrated passive solar and wood design for the Pacific Northwest.** Duffield, J. (Univ. of Montana, Missoula). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 698-702(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The design, construction and performance of a 240 m^2 (2600 ft^2) passive solar home in Missoula, Montana are described. The design is of particular interest for Pacific Northwest sites characterized by poor to moderate levels of sun and environmental constraints on the type of supplemental fuel. While wood is an abundant and relatively cheap fuel in western Montana, winter inversion conditions and a massive shift to wood heat has led (in Missoula) to

violation of all federal and state ambient air standards for particulates. The key feature of the design employed here is to integrate a wood burning furnace into a massive Trombe wall. The passive solar and conservation aspects of the design minimize the total demand for the supplementary fuel. In addition, by using the passive storage, very hot cleanburning (and infrequent) fires can be built. The storage also allows cycling through periods of high inversion/pollution conditions. The design is also innovative in the use of thermal zones and incorporates an attached greenhouse for winter food production. Choice of construction materials (including recycled beams and local stone) and design were closely influenced by the relatively secluded nature of the site. The building shell is essentially a sculptural statement derived from the five year long interaction of the owner/builder and the site's other (wild) inhabitants.

33515 **Passive solar commercial building: new applications of an old technology leads to architectural innovations.** Kroner, W.M. (Rensselaer Polytechnic Inst., Troy, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 703-706(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Visitors Information Center (VIC) at Rensselaer Polytechnic Institute, Troy, New York, includes passive solar heating, cooling, and daylighting systems. Sixty-four percent of the annual heating load is suplied, 80% of the annual cooling load is supplied by natural cooling, and the daylighting contribution is 61%. The most innovative design elements are the building's multi-energy flow systems for heating, cooling, and daylighting constantly searching for free energy before actuating back-up systems. The energy systems are also integrated with personalized technologies designed to provide the occupants' sensory needs, rather than those of the building. The building applies familiar passive technologies in new ways, suggesting a new architecture, one that depends on a building's occupants as well as its systems for energy conservation.

33516 **Passive solar heating, cooling, and natural daylighting for a fire station in Springfield, Oregon.** Paz, A. Jr. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 707-711(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Fire stations are a unique construction and building type that are extremely well suited to embracing passive solar applications. These buildings have the potential of forming a high thermal mass enclosure within their normal construction materials. They are usually constructed of heavy, dense, low maintenance and permanent materials of brick, concrete block, and poured-in-place concrete floors, ceilings and walls. Consequently, a fire station carries a natural solar advantage over many building types because it normally contains a large amount of thermal mass material desirable in the design of an effective passive solar heated and cooled building. Yet, there are a number of specialized design issues related to the fire department occupant activities, and the solar systems employed must be carefully examined in order to properly integrate the building's thermal assets into an energy-saving passive solar project.

33517 **Donohue Corporate Office Headquarters: a cost effective energy conscious design.** Marcheske, M. (Donohue and Associates, Inc., Sheboygan, WI); Ruppel, D.; Gau, R.; Vita, D.; Walsh, T.; Daryanani, S. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 712-716(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The focus is on the design techniques in the recently completed corporate office building of Donohue and Associates, Engineers and Architects, located in Sheboygan, Wisconsin. The new location, located at a latitude of 43° north, will provide 25,000 additional square feet on two floors, while providing a regional show case for energy-efficient commercial building design that emphasizes a quality environment predicated on the integration of daylighting and indirect lighting systems as well as the coordination of passive solar techniques with auxiliary mechanical systems. Emphasis is on the utilization of a design-build approach, coupled with a design-team approach that required close cooperation between the architect, engineer, energy consultant and owner as well as the general contractor and subcontractors, in order to provide a qualtiy office environment in which to work.

33518 **Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California.** Colyer, R.D.; Freeman, S.P. (Colyer/Freeman Group, San Francisco, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 717-721(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The Antelope Valley California Poppy Reserve contains the largest remaining stand of the California Poppy (Eschschozia Californica), the state flower of California. To welcome the thousands of people viewing the desert wildflowers each spring, the State of California decided to build a visitor/interpretive center. This building deals primarily with the question of fit; a building's fit aesthetically with its site and the fit of a building's design response to the climate of the site. In this case, both aspects of this question led the client and architects to seek an earth sheltered solution using materials at least metaphorically indigenous to the region. On both a technical and formal level, this building seeks to fit the unique climate and historical heritage of its site.

33519 **Designs for a zero-energy elementary school in Oregon.** Wilmot, W.G. (Oregon Department of Education, Salem); Reynolds, J.S. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 734-737(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The design problem of an elementary school that is completely energy independent is addressed. The building relies 100% on daylighting. Passive solar heating by water walls is included, and cooling is by ventilation and shading. Cooking energy is provided by a large photovoltaic array supplemented by methane produced from kitchen and human wastes. Cold storage would be limited to a root cellar. Water would be heated by solar collectors. (LEW)

33520 **Missouri house.** Kirby, J.; Wade, H. (Missouri Dept. of Natural Resources, Jefferson City, MO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 742-745(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Although many individual designs for passive solar homes exist, few are suitable for general implementation. Additionally, few are in the low to moderate price range. The Missouri House is an approach to meeting those needs. Basic criteria have been developed which result in a home of reasonable price which uses half the energy requirements of an equivalent FHA MPS house.

33521 **Food and fuel: round two.** Wolfe, D.E. (Information Plus, East Swanzey, NH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 749-752(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The energy input:output ratio for the US commercial agricultural system approximates 8 Btu:1 Btu. Home vegetable gardens, equivalent in acreage to that commercially farmed for vegetables in California, have an energy in:out ratio of 1.23×10^3 Btu/lb as compared to the supermarket input of 2.94×10^3 Btu/lb, while processed vegetables account for the greatest use of energy. The food industry, ranked sixth in energy use, consumes 16.5% of the annual fossil fuel budget. An estimated 40,000 residential attached heat-producing solar greenhouses can be cultivated intensively year-round, thus saving home processing energy and reducing reliance on supermarket fresh and processed foods. This study analyzes the energy inputs of a solar heat and food producing greenhouse located in SW New Hampshire, and estimates the energy output of a 70 sq ft garden grown in that greenhouse over 1 year. An energy input:output ratio for the garden is developed that is compared to one for similar acreage grown commercially.

33522 **NCAT National Greenhouse Grant Program: a model for technology transfer.** McBride, J.R.; Shourds, K.; Lefor, A.; Krigger, J. (National Center for Appropriate Tech., Butte, MT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 753-757(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This paper reviews the technology transfer of the 1980 National Center for Appropriate Technology (NCAT) Solar Greenhouse Grants Program. Last summer, 100 Community Action Agencies (local anti-poverty organizations) received $1500 grants for materials to construct attached solar greenhouses. The novel aspect of the program was the mechanism for technology transfer. Regional solar greenhouse construction workshops were held by NCAT for representatives of community agencies receiving the grants. The students in the regional workshops then returned to their locales to lead similar workshops in building the greenhouses. This multi-tiered technology transfer approach appears to be an effective means of disseminating simple technologies to a large number of people.

33523 **Energy conservation measures for quonset type greenhouses in cold climates.** Schoenau, G.J.; Green, G.H.; Besant, R.W.; Bigsby, F.W.; Arinze, E.A. (Univ. of Saskatchewan, Saskatoon). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 758-762(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Energy conservation measures applied to a small size commercial arch type greenhouse oriented north-south and located in a cold climate (6000°C days) are evaluated. The conservation measures include insulated north end and side walls, a night shutter system, an air to air heat exchanger and passive and active water thermal storage systems. The added insulation and night shutter system, an air to air heat exchanger and passive and active water thermal storage systems. The added insulation and night shutter systems were the most economically attractive features while the active thermal storage system had the longest payback period.

33524 **Passive solar greenhouse retrofits: a precursor to an integrated biomass conversion system.** Kissner, F. (SUNY-Plattsburgh, Chazy, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 763-767(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Three freestanding greenhouses presently exist at the William H. Miner Institute (WHMI) in Chazy, NY, 6 miles from the US-Canadian border. The construction of these greenhouses was completed in the fall of 1975. Supplemental heating was supplied utilizing liquid petroleum gas (LPG), and ventilation was accomplished with electric fans. No thermal storage was provided. From October, 1975 through December, 1979 the greenhouses were intermittently monitored, both empty and with innovative growing projects being conducted. During this time period over $4300 worth of LPG was consumed. Because of these high energy costs, a series of retrofits was undertaken, beginning in January, 1980. Performance data show that the retrofits definitely were cost effective, but without supplemental heat the structures still undergo sub-freezing temperatures during prolonged cold, cloudy periods in the winter. Temperature response of the greenhouse environment, the type of growing project conducted and proposed supplemental heating mechanisms are discussed.

33525 **Low cost site built fiberglass water containers for thermal mass and small scale aquaculture.** Shepard, M. (New Mexico Solar Energy Association, Santa Fe, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 768-772(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A step by step method of constructing water storage tubes from commonly available fiberglass glazings is outlined. Drawing on experience gained in making tubes for the NMSEA demonstration greenhouse aquaculture program, sufficient information is presented to enable the layperson to build his or her own water containers, from a few gallons to hundreds of gallons in capacity.

33526 **Results of a retrofit sunspace testing program.** Martin, M. (Habitat Center, Walnut Creek, CA); Nelson, L.; Wexler, A.; Schiller, S.R. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 778-782(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The results of a controlled thermal performance testing program on four retrofit sunspace modules located in northern California are described. The program was designed to test the performance of sunspaces attached to existing houses of frame construction. The major design variables - glazing, thermal mass and common wall venting - were evaluated to determine their effect on the thermal performance of the sunspaces in this climate.

33527 **New York State passive solar design and retrofit competition.** Niles, J.E.; Barron, J.J.; Cole, W.J. (New York State Energy Research and Development Authority, Albany, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 793-797(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Many homeowners are faced with the problem of reducing their home energy bills. Solar and energy conservation retrofitting is a potential solution for the home energy problem, capable of significantly reducing heating, cooling, and domestic hot water energy bills. The technique used by 12 homeowners and their designers to adapt and integrate various solar and energy conservation features into 12 different projects is discussed. A variety of innovative solutions were utilized in this project and the integration of those ideas into the buildings being retrofitted is discussed. Integration of sunspaces, increased south glazing, solar domestic hot water, storage systems, air distribution systems, insulation systems, etc., is discussed. All 12 of these designs are award winning projects submitted in response to an ERDA competitive solar retrofit announcement.

33528 **Passive solar retrofitting: generalizing from a case study.** Osterberg, A.E. (Iowa State Univ., Ames). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 798-801(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Passive design potentials of the case study house, which was originally an 1860 Iowa farm house, were analyzed in respect to historical image, aesthetic qualities, structural characteristics, functional room layout, and site potentials and constraints. The south portion of the old house was rearranged to work in conjunction with a sun space addition to become open living space on the first floor and a sewing and craft area on a second floor balcony. Mass for heat storage was accomplished through the use of a one lane exercise pool, heat sink housed within the sun space. Performance data indicate that the thermal mass has proved to be more than adequate in storing heat and in minimizing diurnal temperature swings within the living space.

33529 **Solarization and weatherization of a turn-of-the-century brick row house.** Thornton, R.K. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 802-806(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A turn-of-the century three-story, three family brick row house in the Boston area has been weatherized and retrofitted with a Trombe wall and solar rooms. The already low fuel usage is predicted to decrease by approximately a factor of 10 and the simple payback period should be about three years.

33530 **Residential heating and cooling loads and costs for the south.** Lau, A.; Hyatt, T. (Southern Solar Energy Center, Atlanta, GA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 809-813(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Typical residential heating and cooling loads are examined for twenty-four southern cities and six cities in other regions of the US for comparison. A 1536 square foot house is examined, with concrete slab floor, frame construction, ventilated attic, and glazing area equivalent to 12% of the floor area. Five basic variations of this house were analyzed - two insulation levels with two compass orientations each, and a sun-tempered case. The estimated heating and cooling loads and the impact of insulation, house orientation, and sun-tempering are illustrated in the form of regional maps. It is shown that the free energy savings resulting from proper house orientation and sun-tempering are comparable to the savings from increased insulation in the South. Typical fuel costs and efficiencies

are also examined and shown to have a major role in determining the building design emphasis (heating or cooling).

33531 **Passive solar energy retrofit for energy efficient housing in hot humid climates.** Meyers, A.C. III. (Inst. of Basic and Applied Research, Inc. Ames, IA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 814-816(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The number of existing houses coupled with the depressed housing market means that only by an aggressive and effective retrofit program, can the energy efficient passive solar energy house make an impact on energy needs in hot humid climates. Techniques are discussed for energy efficient passive solar energy retrofitting and design and their application to two structures in the hot humid climatic regions of Texas. The results of laboratory and modeling work done in Houston and Corsicana, Texas were applied and will be discussed.

33532 **Thermal mass in a hot-humid climate.** Garrison, M. (Univ. of Texas, Austin). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 817-821(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Interior mass walls in a hot humid climate can be thermally grounded to the earth heat sink. The mean radiant temperature of the grounded interior mass walls is warmer in winter and cooler in summer than interior air temperatures. The result is an improvement in the bio-climatic sensation of comfort and an increase in energy conservation.

33533 **Predicted and observed performance of a buried earth-air heat exchanger cooling system.** Zoellick, B. (Sunspace, Inc., Ada, OK). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 822-826(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This experiment had two objectives: 1) to collect performance data on an earth-air heat exchanger designed to cool incoming air by first passing it through a system of underground ducts; 2) to test a computer model of this cooling system. The computer model was constructed using standard thermodynamic formulae, and should therefore be applicable to other earth-air heat exchanger designs. The data collected indicate that the underground cooling system is able to drop air temperatures by 15°F. Comparison of the data with the performance predicted by the computer model shows that the model is a very good predictor of this particular system's performance. An outline of the computer model is included.

33534 **Detached earth cooling with radiant interior building elements.** Ruberg, K.; Akridge, J.M.; Benton, C.C.; Houston, M.M. (Georgia Inst. of Tech., Atlanta). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 827-831(1981). (CONF-810925—). Contract AC02-79CS30238. Portland, OR, USA (8 Sep 1981).

Earth coupled cooling requires a heat exchange element in the building that maintains its cooling efficacy at relatively high (22.7°C) ground temperatures. Decoupling the earth from the building element and transferring heat from these interior surfaces to a cooling field with water, allows the occupant control over the temperature of the space and improves the cooling potential of the earth. Radiant wall panel heat exchangers are identified as viable options. Preliminary experiments with a concrete slab cooling panel indicates that mass incorporated in a radiant element yields uniform panel temperatures and maximizes cooling field potential. Radiant coupling to a secondary mass increases the response time of the slab and maintains cool temperatures in the secondary mass.

33535 **Cooling effect of night ventilation.** Chen, Z. (Hunan Univ., China); Mitchell, J.W. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 832-836(1981).

The large range of the outdoor air temperature variation during day and night offers the opportunity to use the outdoor air at night as a natural cooling source. This would improve the indoor environment of non-air conditioned buildings or reduce the cooling load of air conditioned buildings. The cooling effect of night ventilation can be predicted by computer simulation of the room thermal processes. The simulation procedure and the results of the effect of night ventilation are reported in this paper. The conditions under which the average room temperature can be maintained below the average outdoor temperature are discussed.

33536 **Monticello: an early American prototype for solar architecture.** Wilcox, R.P. (Univ. of Kentucky, Lexington). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 860-864(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

After an uncertain resurrection in the seventies, solar architecture is now a positive fact of American building. The economics of passive solar, no longer questionable, are propelling us toward an age of buildings with quite remarkable energy performance. The results to date of that occurrence are critically examined by looking, for purposes of comparison, at Thomas Jefferson's Monticello in Charlottesville, Virginia, which was built at the end of the eighteenth centruy, well before the age of fossil fuels redefined the making of architecture.

33537 **Passive solar commercial building in Minnesota.** Thorstenson, J. (Gene E. Hickey and Associates, Edina, MN); Weidt, J.L. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 880-884(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The passive design features of the new Security State Bank building of Wells, Minnesota are outlined, including direct gain and daylighting.

1410 Solar Collectors And Concentrators

REFER ALSO TO CITATION(S) 33365

33538 **(CONF-830622—4) Time dependence of ground heat loss from solar ponds.** Hull, J.R.; Kamal, J.; Nielsen, C.E. (Argonne National Lab., IL (USA); Ohio State Univ., Columbus (USA)). 1983. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01. Order Number DE83010758.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

The time dependence of ground heat loss from solar ponds is examined by detailed analysis of the ground temperature histories from two experimental solar ponds, a 400 m^2 pond at the Ohio State University, and a 1000 m^2 pond at Argonne National Laboratory. An analytical method is presented that solves the thermal diffusivity of the soil as a function of time, using ground thermocouple data to establish boundary conditions for the one-dimensional temperature diffusion equation. Analysis indicates that diffusivity has not decreased with time, which implies that the clay soil under the ponds is not drying out as the ponds heat up.

33539 **(DOE/ET/21105—T1) Experimental regulation of advanced solar central receivers. Final report.** (Spectron Development Labs., Inc., Costa Mesa, CA (USA)). Jun 1981. Contract AC01-79ET21105. 131p. NTIS, PC A07/MF A01. Order Number DE83007078.

Portions are illegible in microfiche products.

An investigation of natural convection losses from cavity-type solar central receivers is described and results are given. The approach followed was that of a fundamental experimental study in a simple cavity subject to well controlled boundary conditions. The Laser Doppler Velocimeter proved to be a useful technique to measure the velocity profiles associated with natural convection. Visualization techniques provided an understanding of the general behavior of the flow, particularly in three dimensional experiments. Experiments on systems of high Rayleigh numbers are described. (LEW)

33540 (UCLA-ENG—8078) Transpired solar air heaters. Volume 3. Effect of wall suction on laminar entrance flow with application to solar air heaters. Final report. Rhee, S.J. (California Univ., Los Angeles (USA). School of Engineering and Applied Science). Nov 1980. Contract FG04-77CS34088. 340p. NTIS, PC A15/MF A01. Order Number DE83012092.

Portions are illegible in microfiche products; Thesis.

Numerical solutions are obtained for hydrodynamically and thermally developing steady-state laminar flow in a long rectangular cavity with uniform suction and one wall and uniform temperature or heat flux independently prescribed at each wall. Fully developed velocity profiles obtained for Re/sub w/ = 4.0 and 10.0 show excellent agreement with the similarity solutions of previous investigators. For the temperature field, building-block solutions and linear superposition allow the construction of the solution for any case of uniform boundary conditions. Application of the results to the analysis and design of transpired solar air heaters is discussed. Collection efficiencies for several solar air heaters are predicted by performing a system analysis. Result of the system analysis obtained through computer simulation are in good agreement with experimental data; the maximum deviations are a 2% overprediction and a 3% underprediction in instantaneous efficiency. Five selective-black-metal-plate experimental solar air heaters with and without transpiration were designed, fabricated, and tested to compare their technical merits and to prove how well the theoretical results and system analysis predict performance of actual solar collectors. Based on the test results, the configuration with slotted absorber plate (the working fluid transpires through the slots) is the best solar air heater in terms of collector efficiency and pressure drop among the five configurations. Based on the knowledge obtained from the theoretical results, system analysis, and experimental results, discussion of the design of a full-scale selective-black-metal-plate solar air heater with transpiration through slots is presented. Discussed are: (1) the number of teflon films for cover glazing assembly; (2) the spacing between glazing elements; (3) the spacing between the absorber plate and the inner glazing; and (4) the design of inlet and outlet manifolds.

33541 (UPTEC—8078-E) Preparation and characterization of solar absorbing films on stainless steel. Karlsson, T. (Uppsala Univ. (Sweden). Inst. of Technology). Sep 1980. 65p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750493.

Portions are illegible in microfiche products.

The paper evaluates the process of international Nickel for the colouring of stainless steel. The film formation has been investigated and the surface has been characterized by optical methods, scanning electron microscopy, electron microprobe and X-ray fluorescence. The measurements show that the surface film is enriched by chromium, the optical properties was found to be due to the increasing index of refraction. The reproducibility of the colouring and hardening methods was satisfactory.

33542 (UPTEC—80121-E) Solar absorbing properties of thermally oxidized stainless steel. Valkonen, E. (Uppsala Univ. (Sweden). Inst. of Technology). Dec 1980. 37p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750495.

Portions are illegible in microfiche products.

The selective properties of thermally oxidized ferritic, stainless steel have been investigated. The oxidation was done in air at temperatures between 600 and 950 degrees C. Values of reflectance was measured from 0.35 to 2.4 μm (total reflectance and from 3 to 14 μm (specular reflectance). The calculated values of absorbbance (a=0.88+-0.02) and emittance (e=0.1) were independent of temperature. Studies of depth profile with Auger electron spectroscopy (AES) and a surface study with Electron Spectroscopy for Chemical Analysis (ESCA) show that the surface film mainly consists of Cr_2O_3 with small amounts of Fe_2O_3, TiO_2 and MnO_2. The oxidized surface has shown good thermal stability. The optical properties were unaffected by heat treatment in 500 degrees C for 1000 hours.

33543 Advanced solar thermal technology. Leibowitz, L.P.; Hanseth, E.; Liu, T.M. (Jet Propulsion Lab., Pasadena, CA). *Energy Progress;* 2: No. 2, 118-121(Jun 1982).

The application of dish solar collectors to industrial process heat (IPH) has been reviewed. IPH represents a market for displacement of fossil fuels (10 quads/y). A 10% market penetration would indicate a substantial market for solar thermal systems. Apparently, parabolic dish systems can produce IPH at a lower cost than that of troughs or compound parabolic concentrators, even though dish fabrication costs per unit area are more expensive. Successful tests of point-focusing collectors indicate that these systems can meet the energy requirements for process heat applications. Continued efforts in concentrator and transport technology development are needed. 7 figures.

33544 Vandal resistance properties of solar glazing materials. Wilson, A. (New England Solar Energy Assoc., Brattleboro, VT); Hayes, J. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 89-92(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Reported is an extensive investigation of the vandal resistance properties of common solar glazing materials. Many implements of destruction, including shotgun, splitting maul, rocks, pry bar, gasoline and logging chain, were used to determine how much abuse these glazing materials might withstand. In the hands of seasoned vandals, the glazing materials are found to be vulnerable to abuse.

33545 Thermosiphoning air panels: going with the flow. Reno, V. (Total Environmental Action, Inc., Harrisville, NH). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 149-153(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Thermosiphoning air panels (TAP) are examined using TAP-FLOW computer program and actual field measurements, leading to specific recommendations that may justify TAP constrution.

33546 Temperature extremes in vertical collectors. Wilson, A.; Sherwood, L. (New England Solar Energy Association, Brattleboro, VT). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 154-158(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

There is currently a great deal of interest throughout the country in low-cost solar wall panels. Many such applications use wooden absorber plates or supports. Using wood and certain other materials in solar collectors raises important questions of safety. Do such collectors pose a fire threat. Will there be deterioration over time that will reduce the structural strength of the wood. These questions were investigated at the New England Solar Energy Association through computer analysis. Different collector configurations and operating conditions were simulated in the analysis, changing such variables as the number of layers of glazings, the amount of wall insulation, vented vs unvented conditions, and average outside temperature. Maximum temperatures reached in the different simulations varied from 87 to 226°C (188 to 439 F). Effects of hightemperatures on wood were investigated and it was concluded that high temperatures can be dangerous in certain vertical solar collector designs.

33547 Neutral density transparent solar collector. Lillywhite, M. (Solstice Designs, Inc., Evergreen, CO). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 159-162(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A relatively new collector glazing system is described. The collector system is called the Neutral Density Transparant Solar Collector. The transparent solar collector (TSC) was developed to permit larger glazed areas to be used in residential, commercial and particularly public access buildings such as schools, restaurants, apartments and hotels without causing overheating or excessive heat loss but still enabling the capture of a significant fraction of the available solar irradiance. The concept is to trap excess sunlight within the triple glazing system using a neutral transmitting but tinted absorbing center piece of glass, acrylic or metal screen material as an absorber plate. The excess sunlight is converted to heat in the absorbing glass and convectively (passively) transported be-

tween the inner two glazing layers. The remaining sunlight is transmitted into the inner space. The use of neutral density partial absorber material is critical where plant growth or human visual comfort are concerned because an attenuated natural solar spectral distribution must be maintained.

1420 Heat Storage

REFER ALSO TO CITATION(S) 33426, 33525, 33543

33548 (ANL—82-89) Comparison of testing methods for latent-heat-storage devices. Cole, R.L.; Hull, J.R.; Lwin, Y.; Cha, Y.S. (Argonne National Lab., IL (USA)). Feb 1983. Contract W-31-109-ENG-38. 100p. NTIS, PC A05/MF A01. Order Number DE83011932.

ASHRAE Standard 94-77, Method of Testing Thermal Storage Devices Based on Thermal Performance, was developed to allow manufacturers of thermal energy storage devices to compare their products in a meaningful way. When Standard 94-77 was used for thermal energy storage products based on latent heat storage, the Standard was found to be inadequate for comparison of these devices. Standard Project Committee SPC 94.1 was established to devise a Standard that would be adequate for comparing latent heat systems. The purpose of this report is to describe several alternatives to Standard 94-77 and discuss the advantages and disadvantages of each alternative. The discussion focuses on two proposed replacement standards and includes experimental results for each. The experimental results are from tests conducted on a PCM storage tank that uses sodium thiosulphate as the PCM and water as the heat transfer fluid. The experimental arrangement is discussed in detail. The first proposed standard, which is here called the Yu Lwin Method, is substantially based on Standard 94-77. It attempts to solve the deficiencies of the old standard by more carefully defining the parameters associated with the test. In addition, a test for degradation with cycling is proposed as part of the standard. The basis for the charge and discharge tests is a constant inlet temperature to the PCM tank. This method is discussed in detail in Section II. The second proposed standard is that recommended to Project Committee SPC 94.1, as of September, 1982. This proposed standard differs considerably from Standard 94-77 in that the theoretical storage capacity is not part of the analysis, and that constant energy input and output are respectively used in the charge and discharge tests. This method is discussed in detail in Section III. The two proposed standards are compared in Section IV. In addition, this Section discusses other proposed methods. Conclusions and recommendations are presented in Section V.

33549 (BMFT-FB-T—82-171) Practical and theoretical analysis of continuous selection of temperature layers in a hot water tank by an experimental tank and a simulation model. Patil, M.; Wensierski, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 161p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750086.

Portions are illegible in microfiche products.

In a hot water tank with special moving fixtures for charging and discharging, which control the thermal stratifications intentionally and continuously, the stabilization and the behaviour of stratifications were investigated and experimental data have been recorded. Based on experimental data, the dynamic performance of such a type of storage tank for a complete yearly estimation was compared with that of a normal conventional tank, for which a computer calculating model has been developed. The practical and theoretical investigations have shown the limitations of using these stratifications in such storage tanks for space heating and hot water preparation. Advantages and disadvantages of stratified tanks with continuous control have been compared with those of conventional tanks. The results have been documented with the help of diagrams and tables.

15 GEOTHERMAL ENERGY

1501 Resource Status And Assessment

33550 (DOE/NBM—3012133) Report of the Energy Research Advisory Board Geopressured Resources Subpanel of the Geothermal Panel. (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). Nov 1980. 13p. NTIS, PC A02/MF A01. Order Number DE83012122.

The main objective of the Geopressured Resources program is to define and assess the potential of the resource and demonstrate its economic viability so private industry will take over development. The Panel recommends that the program continue at about the present pace, but only after a shift in emphasis toward delineating low-salinity prospects for further testing.

33551 (DOE/NBM—3012267) Report of the Energy Research Advisory Board Direct Heat Subpanel of the Geothermal Panel. (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). Nov 1980. 13p. NTIS, PC A02/MF A01. Order Number DE83012267.

Portions are illegible in microfiche products.

Geothermal resources and their market potential, barriers to development, the present federal program, and needed information are discussed. (MHR)

33552 (NE-TEKNIK—81-1) Geothermal energy extraction in Skaane. Final report, stage 4. Bjelm, L.; Persson, P.G. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jun 1981. 54p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750497.

Portions are illegible in microfiche products.

The geothermal energy potential of the south of Sweden has been surveyed. The normal temperature level is 40-60 degrees C. The water chemistry represents various salt contents from 3 to 20 per cent. The theoretically calculated geothermal energy potential of Skaane is about 7700 TWh. The main geothermal formation probably is the Campanian Sandstone. The operation time for a two-borehole system is calculated to about 50 years.

1502 Geology And Hydrology Of Geothermal Systems

33553 (USGS-OFR—78-798) Seismic monitoring at The Geysers Geothermal Field, California. Marks, S.M.; Ludwin, R.S.; Louie, K.B.; Bufe, C.G. (Geological Survey, Menlo Park, CA (USA)). [nd]. 50p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

Two distinct clusters of microearthquakes have been identified at The Geysers, possibly relating to two independent pressure sinks resulting from steam production described by Lipman, and others (1977). Unlike earthquakes in the Maacama-Rodgers Creek fault zone to the south and west, earthquakes at The Geysers are confined to depths of less than 5 km. The present level of seismicity at The Geysers appears to be higher than the preproduction level and is higher and more continuous than the seismicity in the surrounding region. Earthquakes in the steam production zone at The Geysers resemble earthquakes in the surrounding region with regard to focal plane solutions, source characteristics and magnitude distribution (b slope). Subtle differences in earthquake characteristics may be resolved by analysis of more extensive data now being gathered in the region.

1503 Geothermal Exploration And Exploration Technology

REFER ALSO TO CITATION(S) 33552, 33568

33554 **(BMFT-FB-T—82-160) Seismic reflection investigation of structural and lithologic parameters in the area of the Urach geothermal anomaly.** Meissner, R.; Bartelsen, H.; Krey, T. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 78p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750087.

Planning and performance of combined seismic reflection-refraction measurements with large spread lengths and high subsurface coverage in the area of the Urach geothermal anomaly revealed the following results: 1. Horizontal velocities in the upper 3 km of the basement, as obtained by the refraction interpretation, have a minimum in the area of the geothermal anomaly. According to laboratory data, the velocity decrease corresponds to a temperature increase of +50°C as also indicated by the measurements in the Borehole Urach III. 2. The interpretation of vertical interval velocities, as obtained by the reflection methods, has revealed a limited body with 10% lower velocities between 6 and 28 km depth below the Urach anomaly. This body is strongly indicative of a large temperature anomaly in the whole earth's crust below Urach.

33555 (DOE/ER/70224—T6, pp 12p, Paper 6) **Relation of well-log velocities and magnetic susceptibilities to laboratory value: Conway granites, White Mountains, New Hampshire.** Warren, N.; Tiernan, M.; Coffey, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

A series of studies were conducted on core samples from an ERDA borehold in the Conway granite of White Mountains, New Hampshire. The correlation of well log velocities and magnetic susceptibilities to laboratory values for these same samples are presented here.

33556 **(DOE/ID/12259—T1) Geothermal Exploratory-Well Project: city of Alamosa, Colorado. Final report, September 1980-April 1983.** Phetteplace, D.R.; Kunze, J.F. (Energy Services, Inc., Idaho Falls, ID (USA)). 1983. Contract FC07-81ID12259. 133p. NTIS, PC A07/MF A01. Order Number DE83012492.

Portions are illegible in microfiche products.

The Geothermal Exploratory Well Project for the City of Alamosa, Colorado is summarized. In September, 1980, the City of Alamosa made application to the US Department of Energy for a program which, in essence, provided for the Department of Energy to insure that the City would not risk more than 10% of the total cost in the well if the well was a failure. If the well was a complete success, such as 650 gpm and 230°F temperature, the City was responsible for 80% of the costs for drilling the well and there would be no further obligation from the Department of Energy. The well was drilled in November and early December, 1981, and remedial work was done in May and June 1982. The total drilled depth was 7118 ft. The well was cased to 4182 ft., with a slotted liner to 6084 ft. The maximum down hole temperature recorded was 190°F at 6294 ft. Testing immediately following the remedial work indicated the well had virtually no potential to produce water.

33557 **(LBL—15671) Investigation of the conductivity distribution in the vicinity of a cascade volcano.** Mozley, E.C. (Lawrence Berkeley Lab., CA (USA)). Nov 1982. Contract AC03-76SF00098. 394p. NTIS, PC A17/MF A01. Order Number DE83012478.

Portions are illegible in microfiche products; Thesis.

Magnetotelluric and telluric data were acquired in the vicinity of Mount Hood Oregon as part of a multidisciplinary exploration program to evaluate the geothermal potential of this stratocone volcano. Eleven field components were acquired simultaneously over the frequency band of 50. to .001 hertz. These data consisted of one five component magnetotelluric base site, two sets of two component remote electric field measurements and one set of remote horizontal magnetic field measurements. The data were recorded digitally in the field and processed later using the remote electric and magnetic signals to obtain unbiased tensor impedance and geomagnetic transfer function (tipper) estimates.

33558 **(USGS-OFR—78-105C) Audio-magnetotelluric data log and station location map for the Glamis Known Geothermal Resource Area, California.** Senterfit, R.M.; Heran, W.D. (Geological Survey, Denver, CO (USA)). 1978. 8p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

33559 **(USGS-OFR—78-105D) Audio-magnetotelluric data log and station location map for the Saline Valley Known Geothermal Resource Area, California.** Senterfit, R.M.; Moeller, D.D. (Geological Survey, Denver, CO (USA)). 1978. 4p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

33560 **(USGS-OFR—78-106C) Telluric profile location map and telluric data for the Glamis Known Geothermal Resource Area, California.** Hoover, D.B.; Radtke, B.; Moeller, D.D. (Geological Survey, Denver, CO (USA)). 1978. 3p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

33561 **(USGS-OFR—78-107-A) Principal facts for a gravity survey of the Double Hot Springs Known Geothermal Resource Area, Humboldt County, Nevada.** Peterson, D.L.; Kaufmann, H.E. (Geological Survey, Denver, CO (USA)). 1978. 6p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

During July 1977, forty-nine gravity stations were obtained in the Double Hot Springs Known Geothermal Resource Area and vicinity, northwestern Nevada. The gravity observations were made with a Worden gravimeter having a scale factor of about 0.5 milligal per division. No terrain corrections have been applied to these data. The earth tide correction was not used in drift reduction. The Geodetic Reference System 1967 formula (International Association of Geodesy, 1967) was used to compute theoretical gravity.

33562 **(USGS-OFR—78-107-B) Principal facts for a gravity survey of the Gerlach Extension Known Geothermal Resource Area, Pershing County, Nevada.** Peterson, D.L.; Kaufmann, H.E. (Geological Survey, Denver, CO (USA)). 1978. 6p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

During July 1977, fifty-one gravity stations were obtained in the Gerlach Extension Known Geothermal Resource Area and vicinity, northwestern Nevada. The gravity observations were made with a Worden gravimeter having a scale factor of about 0.5 milligal per division. No terrain corrections have been applied to these data. The earth tide correction was not used in drift reduction. The Geodetic Reference System 1967 formula (International Association of Geodesy, 1967) was used to compute theoretical gravity. Observed gravity is referenced to a base station in Gerlach, Nevada, having a value based on the Potsdam System of 1930. A density of 2.67 g per cm^3 was used in computing the Bouguer anomaly.

33563 **(USGS-OFR—78-107-C) Principal facts for a gravity survey of the Fly Ranch Extension Known Geothermal Resource Area, Pershing County, Nevada.** Peterson, D.L.; Kaufmann, H.E. (Geological Survey, Denver, CO (USA)). 1978. 6p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

During July 1977, forty-four gravity stations were obtained in the Fly Ranch Extension Known Geothermal Resource Area and vicinity, northwestern Nevada. The gravity observations were made with a Worden gravimeter having a scale factor of about 0.5 milligal per division. No terrain corrections have been applied to these data. The earth tide correction was not used in drift reduction. The Geodetic Reference System 1967 formula (International Association of Geodesy, 1967) was used to compute theoretical gravity. Observed gravity is referenced to a base station in Gerlach, Nevada, having a value based on the Potsdam System of 1930 (fig. 1). A density of 2.67 g per cm^3 was used in computing the Bouguer anomaly.

1504 Legal And Institutional Aspects

33564 **(DOE/NBM—3012254) Report of the Energy Research Advisory Board on hot dry rock.** (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). 1 May 1980. 8p. NTIS, PC A02/MF A01. Order Number DE83012254.

The following terms of reference for the hot-dry-rock concept are discussed; level of success of Fenton Hill experiments, thermal stress cracking, economic feasibility goals and objectives, program pace, program balance, and integration with related programs. (MHR)

1505 Economic And Financial Aspects

REFER ALSO TO CITATION(S) 33564

1506 Environmental Aspects And Waste Disposal

REFER ALSO TO CITATION(S) 34397

1508 Geothermal Power Plants

33565 **(ORNL—5940) Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site.** Murphy, R.W. (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 130p. NTIS, PC A07/MF A01. Order Number DE83012524.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A vertical-fluted-tube condenser was designed, fabricated, and tested with isobutane as the shell-side working fluid in a binary prototype power plant at the Raft River Geothermal Test Site. After shakedown and contamination removal operations were completed, the four-pass water-cooled unit (with 102 outside-fluted Admiralty tubes) achieved performance predictions while operating with the plant surface evaporator on-line. A sample comparison shows that use of this enhanced condenser concept offers the potential for a reduction of about 65% from the size suggested by corresponding designs using conventional horizontal-smooth-tube concepts. Subsequent substitution of a direct-contact evaporator for the surface evaporator brought drastic reductions in system performance, the apparent consequence of high concentrations of noncondensible gases introduced by the brine/working-fluid interaction.

1510 Direct Energy Utilization

REFER ALSO TO CITATION(S) 33551

33566 **(DOE/NBM—3012255) Report on DOE's direct heat program.** (Department of Energy, Washington, DC (USA). Div. of Geothermal Energy). Feb 1981. 2p. NTIS, PC A02/MF A01. Order Number DE83012255.

Significant items are identified in DOE's technical market penetration analysis of the direct-use program. Federal funding levels for the direct-use program are recommended. (MHR)

33567 **(EUR—7802-FR) Low-enthalpy geothermal energy for local heating. Final report.** Villaume, M. (O.E.T., Villemomble (France)). 1982. 95p. (In French). European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037.

A study is made of the production, operation, feasibility, and cost of geothermal heating systems for local, domestic and industrial heating purposes, including the computation of economic efficiency, design and construction of heat exchangers and pumps. 55 figures.

1520 Geothermal Data And Theory

REFER ALSO TO CITATION(S) 33555

33568 **(CTH-JVG—5) Methods for the determination of thermal properties of soils and rocks.** Sundberg, J. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden)). Jan 1982. 73p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750499.

Portions are illegible in microfiche products.

The thermal properties of soils and rocks are shown to be dependent on moray varibles. A survey of methods for the determination of thermal properties is presented. The measurement of thermal conductivity and diffusivity is not stationary and makes the determination of heat capasity possible. The use of heat generating probes together with temperature measuring probes facilitate the measurement of conductivity and diffusivity. A new method 'Transient Hot Strip' has been tested on geological materials. The 'Divided Bar' method which is stationary permits the measurement of conductivity. Theoretical calculation methods are shown to be sufficient in certain cases.

33569 **(DOE/ER/70224—T6) Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.** Warren, N.; Coffey, N. (California Univ., Los Angeles (USA). Inst. of Geophysics and Planetary Physics). 30 Oct 1982. Contract AT03-76ER70224. 293p. NTIS, PC A13. Order Number DE83005018.

Paper copy only, copy does not permit microfiche production.

Separate abstracts were prepared for eight papers which comprise the bulk of this report. A short overview of the contract work is included. (MHR)

33570 (DOE/ER/70224—T6, pp 8p, Paper 1) **Statistical characterization of complex crack and petrographic texture: application to predicting bulk physical properties.** Warren, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

The problem considered is that of predicting rock physical properties from observations of the structure of the rock. The approach here departs from previous studies in that both the physical properties and structural features are taken as statistical data and the relations between them are cast as statistical functions. This approach is termed a quantitative petrostructure analysis. This paper deals with two aspects of making such a study; parameterizing patterns of topographic features of rock, and characterizing variables to allow correlation studies to be carried out. The principle of a quantitative petrostructure analysis is outlined and illustrated using maps from two samples of Conway granite.

33571 (DOE/ER/70224—T6, pp 41p, Paper 2) **Quantitative petrostructure analysis.** Warren, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

Petrostructure may be thought of as a descriptive space spanned by three axes: mineralogical variables, petrographic variables, and microstructural variables. A petrostructure analysis is a study of the correlations among sets of these variables and other experimental quantities (such as moduli-pressure, resistivity-pressure data). Two aspects of making such a study are dealt with: parameterizing patterns of topographic features of rock and characterizing variables to allow correlation studies to be carried out. This is part of a basic study being done in application to the Hot Dry Rock Project at the Los Alamos National Laboratory. The principle of quantitative petrostructure analysis is outlined and illustrated using maps from two samples of Conway granite. A Digital Enhancement technique, available at Los Alamos (DIADS), was used and is evaluated here.

33572 (DOE/ER/70224—T6, pp 36p, Paper 3) **Rough-crack model for pore compressibility: application to data for crack compliance around a borehole.** Fisher, H. (Los Alamos National Lab., NM); Warren, N.; Blanton, J. 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

33573 (DOE/ER/70224—T6, pp 24p, Paper 4) **Determination of crack porosity from ratios of static and dynamic bulk moduli.** Warren, N.; Tiernan, M.; Coffey, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

There appear to be serious inconsistencies with estimating porosities from static and dynamic strain measurements. Building on the work of Cheng and Johnston (1981), ratios of static to dynamic bulk moduli (K/sub s//K/sub d/) were compiled for a number of different igneous rocks. Porosity estimates were compiled separately. There appear to be systematic trends in K/sub s//K/sub d/, but these cannot be directly correlated to, or used to predict crack porosities. It is found that estimated porosity seems to be directly proportional to the strain amplitude sensitivity of the experiment.

33574 (DOE/ER/70224—T6, pp 36p, Paper 5) **Microcrack formation and hysteresis under hydrostatic cycling.** Warren, N.; Coffey, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

Individual crack populations and changes in these populations were tracked over hydrostatic pressure cycles for a sample of Elberton (Berkeley Blue) granite. The sample was twice cycled to 0.2 GPa and one to 0.08 GPa. Ultrasonic velocities were differentiated to resolve the consistency and reproducibility of the velocity-pressure function. Local slopes were determined for small pressure intervals of about 0.005GPa. Hysteresis was resolved from irreversible changes in the velocity-pressure function. Local slopes are controlled by crack closure. Crack populations opened at about 20% lower pressure than they closed. Crack porosity increased by about 16 to 26% during the experiments. This increase is accounted for primarily by the introduction of new populations with closing pressures in the range of 0.01 to 0.03 GPa and near 0.06 GPa. These populations may represent the failure of weakly sealed cracks under the first hydrostatic cycle to 0.2 GPa. The implied closing laws for cracks in these experiments are consistent with a model of cohesive tensile cracks which also satisfy strain data for stable (repeatable) dilatancy. Holcomb's crack models for stable dilatancy are discussed in the light of the experiments here.

33575 (DOE/ER/70224—T6, pp 68p, Paper 7) **Velocities and dynamic moduli of five EE2 borehold samples: technical summary report.** Warren, N.; Coffey, N.; Hsiao, C. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

Velocity and dynamic moduli data are compiled here for five EE2 minicore samples from four depths. They are 11739-6B 12851-5B, 13461-2B, and 13962-1B and 1C. Measurements were made under hydrostatic pressure to about 0.2 GP. Transducer frequencies were 1 MHz and 3 MHz. The suite includes fine grained, intermediate grained and coarse grained granitic samples, and one basaltic sample. The locations within the well from which the minicores were taken were chosen to be adjacent to, or near locations of minicores characterized at LANL within the Geoscience group ESS-3.

33576 (DOE/ER/70224—T6, pp 55p, Paper 8) **Elberton granite: a compendium of velocities, dynamic moduli and related physical properties.** Warren, N.; Coffey, N. (Univ. of California, Los Angeles). 30 Oct 1982. NTIS, PC A13.

In Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982.

During a three year period a variety of data were collected for samples of Elberton Granite at UCLA in conjunction with the Hot Dry Rock Geothermal Project (HDR) at Los Alamos National Laboratory. This compendium contains results from measurements of density, mineral modes, ultrasonic velocity, moduli and microstructure spectra. Data were obtained from dynamic velocity measurements with pressure to 0.2 GPa, borehole pressurization experiments on thick walled cylindrical cores, and from petrographic mapping.

33577 (DOE/SF/11563—T1) **Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C.** Weare, J.H. (California Univ., San Diego, La Jolla (USA). Dept. of Chemistry). 1981. Contract AT03-81SF11563. 107p. NTIS, PC A06/MF A01. Order Number DE83011632.

Portions are illegible in microfiche products.

The mineral solubility model of Harvie and Weare (1980) is extended to the eight component system, Na-K-Ca-Mg-H-Cl-SO_4-OH-HCO_3-CO_3-CO_2-H_2O at 25°C to high concentrations. The model is based on the semi-empirical equations of Pitzer (1973) and co-workers for the thermodynamics of aqueous electrolyte solutions. The model is parameterized using many of the available isopiestic, electromotive force, and solubility data available for many of the subsystems. The predictive abilities of the model are demonstrated by comparison to experimental data in systems more complex than those used in parameterization. The essential features of a chemical model for aqueous electrolyte solutions and the relationship between pH and the equilibrium properties of a solution are discussed.

16 TIDAL POWER

1607 Tidal Power Plants

33578 (BMFT-FB-M—82-001) **Wave motion in an estuary.** Barthel, V. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 295p. (In German). NTIS (US Sales Only), PC A13/MF A01. Order Number DE83750082.

Wave climate in estuaries with a strongly changing topography is up to now scarcely investigated. As a rule theoretical computations are not applicable. For investigations of wave effects on coastal engineering works (design elements), on morphology and on the vertical movements of large ships by long-period waves measurements were implemented at several places of the outer Weser-estuary by means of wave-rider buoys and wave-gages. Data were analyzed for significant wave parameters and by spectral analysis. The results show the dependence of wave height and period on wind velocity and direction as well as on water depth. Long-period waves and maximum wave heights up to 15 m can occur. The spectral analysis shows, that the loss of energy with respect to height in the reef region is smaller than could be expected and that the main transformation of energy could be detected in front of the wadden sea. Only about 20 percent of the incoming energy reach the interior estuary.

1608 Wave Energy Converters

33579 (NE-TEKNIK—81-2) **Wave power buoys. Model tests of energy absorption on irregular waves in a broad tank.** Bergendahl, L.; Olsson, G.; Soerman, L.O. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Mar 1981. 50p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750512.

Portions are illegible in microfiche products.

Two different wave spectra have been used, with the amplitudes 0.5 and 0.3. The maximum hydrodynamic efficiencies were 22 and 36 per cent respectively. The diameter of the buoy was 0.3 m and its mass varied between 4 and 16 kg, with the average deep-drawing between 0.06 and 0.23 m and damping between 5 and 30 Ns per m. The comparison with buoys weighing 12 kg gave satisfactory results, and good estimates of energy absorption under realistic conditions can be made. It was shown that the choice of the

diameter of the buoy was essential and had to be adjusted to the expected wave spectrum.

33580 **(NE-TEKNIK—81-3) Wave data from Swedish coastal waters 1979-80.** Svensson, J. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Aug 1981. 67p. (In Swedish). NTIS (US Sales Only), MF A01. Order Number DE83750502.

Microfiche only, copy does not permit paper copy reproduction.

Wave measurements have during 1979-80 been carried out at four sites at the Swedish coast. Plottings of wave and wind data, monthly mean significant wave height and wave power as function of wave period are presented. The duration of storms and of calm periods is also computed as well as scatter diagrams (wave height versus wave period, wave power versus wave period).

33581 **(NE-TEKNIK—81-11) Meeting on wave data for wave energy.** Torsethaugen, K.; Claeson, L. (ed.). (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Oct 1981. 266p. (In Norwegian and English). (CONF-8012110—). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83750541.

From Meeting on wave data for wave energy; Trondheim, Norway (1 Dec 1980).

Portions are illegible in microfiche products.

The Swedish-Norwegian cooperation concerning wave energy research programs includes four meetings. The first meeting took place in Gothenburg, May 12th to 14th 1980, the proceedings of which have been published. The proceedings of the second meeting in Trondheim are presented in this report. The contents are the following: models for wave data and forecasting, measurement methods and mathematical analysis. Practical applications were presented and discussed. Some 24 papers were included.

33582 **(NE-TEKNIK—82-1) Investigation of a new type of generators without rotor windings to be used for wave energy conversion.** Von Zweygbergk, S. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Nov 1981. 60p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750480.

Portions are illegible in microfiche products.

The electrical generator of a wave energy converter must be very sturdy. A brushless synchronous generator or a reductance generator are considered suitable. The brushless synchronous generator is equipped with a co-rotating feeder and diod bridge. This generator has a complicated cooling system and is 30 per cent more expensive than a conventional generator. The induction-type synchronous (reluctance) generator has several advantages. The windings are placed on the stator, the rotor having none. This makes the machine sturdy and resistant to salt-bearing damp air. The generator can be overloaded thermally and the stator can be cooled in a forced way. The response time of this field coil can be reduced and the control speed improved. New sort of induction-type synchronous generator are discribed. They have high efficiency. It takes much effort to make them ready for manufacturing.

33583 **(NE-TEKNIK—82-5b) Preliminary measurements of the waves at the Trubaduren lighthouse.** Lindgren, H.;Wahl, G. . (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Dec 1981. 17p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750468.

Portions are illegible in microfiche products.

The report presents the mathematical treatment of wave data which earlier were recorded during Nov. 7th 1977 to May 7th 1978.

33584 **(NE-TFS—81-1) Wave energy in the electric power system.** Skeppstedt, M.; Nilsson, D. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Aug 1981. 42p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750501.

Portions are illegible in microfiche products.

The operation of a wave power plant has been simulated. The data come from a theoretical description of a wave energy converter and from the measurement of wave forces and wind velocities. The sites for data acquisition were the following during 1979: Oelands soedra grund, Almagrundet and the Trubaduren lighthouse. The data from different places were analysed as to the effects of the interconnection of power plants, also wind power plants. The output of wave power plants shows large fluctuations. An investigation of power balance has been made in order to find whether wave power is competitive with conventional energy sources. There might be problems with the control of effective power when the input of wave power amounts to 10 TWh. Hydroelectric power and nuclear power can still be utilized at their best when wave power will be introduced.

17 WIND ENERGY

REFER ALSO TO CITATION(S) 33313

1701 Availability (climatology)

REFER ALSO TO CITATION(S) 33281, 33583

33585 **(BMFT-FB-T—82-168) Design and standardisation of meteorological measurements for wind energy converting systems.** Coppin, P.A.W.; Tetzlaff, G.; Roth, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 66p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750066.

The efficiency of wind energy converters can only be measured reasonably, if several requirements concerning the topographic forms, surface coverage, stationarity of the wind field and turbulence intensity are met. It is only then that the standard models describing wind field properties are applicable and errors do not exceed 3%. Furthermore, the wind speed sensors should not exhibit a systematic error. An investigation on this error was conducted for several standard anemometers. Under simplified conditions three anemometers are sufficient to get reliable data on the overall efficiency of almost every wind energy converting system.

33586 (Juel-Spez—155, pp 19-24) **High time resolution wind data and the dynamic production function of WECS.** Obermair, G.M. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

The specification of large wind turbines with respect to static and dynamic stress and the optimization of all control and regulation systems requires time series data on the actual wind field with a time resolution of approx.= 1 second and from the relevant hights. Very few observations fulfill these requirements. The paper gives a short description of a study which contains simultaneous wind speed measurements in different altitudes with high time resolution on two radio towers. One of the towers is near Aurich, 20 km from the North Sea coast, the other near Keilberg, above the valley of the Danube. The Aurich towers simulate very well the site for a large WEC. The results from the Aurich station allows qualitative conclusions for the power production of a WEC in the real wind field.

33587 **(NE-VIND—81-28) Comparison of wind measurements performed by SODAR and cup anemometer on mast.** Kvick, T. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Nov 1981. 34p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750500.

Portions are illegible in microfiche products.

A test with the purpose to investigate the possibilities for using sodar (Sound Detection And Ranging) for wind profile measurements was carried out at the Naesudden wind power station where a 145 meters meteorological tower is situated. The monostatic doppler sodar was used during the test. Sixty minutes averages of wind speed and direction at the heights 50-, 75-,100-, 125-, and 150 metres above ground measured by the sodar and by the anemometer have been compared. The mean differences were small. The reason for the higher tower values at the lowest levels, is probably

that the wind is more irregular which results in greater overspeeding effects from them cup anemometers. The effect of the different integration methods on the system is also greater when the wind is irregular. In the sodar system the mean wind speed is calculated as a vector sum but from the cup anemometers as a direction independent wind speed is calculated. The test results do not indicate that sodar is less useful wind measuring system than a tower equipped with cup anemometers. A system for transmitting sodar data from the measuring site to a central computer has also been tested. An ASEA remote field station has been designed for transmitting sodar data to SMHI:s receiver central in Norrkoeping.

33588 **(NE-VIND—82-21) Network for the measurement of wind energy at high masts.** Kvick, T.; Zimmerman, T. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Nov 1980. 25p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750503.

Portions are illegible in microfiche products.

Fourteen stations have been erected in order to measure wind energy at the height of 50 to 100 m above the surface. The measurements from these stations shall form the basis of the design of future wind power plants. The choice of the measurement sites is discussed and the geographic conditions around the stations are described. The recording systems cover the measurement of the temperature, the velocity and direction of winds.

33589 **(PNL—4526) Improved diagnostic model for estimating wind energy.** Endlich, R.M.; Lee, J.D. (SRI International, Menlo Park, CA (USA)). Mar 1983. Contract AC06-76RL01830. 86p. NTIS, PC A05/MF A01. Order Number DE83011878.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Because wind data are available only at scattered locations, a quantitative method is needed to estimate the wind resource at specific sites where wind energy generation may be economically feasible. This report describes a computer model that makes such estimates. The model uses standard weather reports and terrain heights in deriving wind estimates; the method of computation has been changed from what has been used previously. The performance of the current model is compared with that of the earlier version at three sites; estimates of wind energy at four new sites are also presented.

1704 Economics

REFER ALSO TO CITATION(S) 33608

33590 (Juel-Spez—155, pp 1-18) **Main results of Annex III a.** Pape, H. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

Large wind energy conversion systems (WECS) are still in a state of development. The cost of WECS are still unknown. Therefore break-even cost have been calculated. The break-even value gives the amount that can be invested in WECS with no cost or reliability disadvantages. Traditional methodology for utility planning and value analysis cannot be applied to calculate the break-even cost of WECS. A simplified approach is used to take into account the changes in unit commitment and dispatch strategy and the cost which are incurred by these changes. After calculating the break-even costs (production savings and capacity savings) of WECS, the next step prior to any investment would be to compare these costs with projected WECS costs. The paper shows that wind power appears to be viable in the near future for utilities with good winds and expensive fossil fuels.

1705 Environmental Aspects

33591 **(NE-VIND—82-26) Preliminary estimation of the expected noise levels from the Swedish WECS prototypes Maglarp and Naesudden.** Soederqvist, S. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 38p. (FFA-TN—1982-01). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750513.

Portions are illegible in microfiche products.

A preliminary estimation of the noise to be expected from the two Swedish prototype WECS, presently under construction, is presented. For the middle- and high-frequency region the expected noise levels are predicted by a scheme developed by Keast and Potter. For the downwind Maglarp turbine calculations of the low frequency noise has been performed by MIT (Landahl and Martinez). The results of these predictions are presented in the first part of this report. A discussion of the results as well as the posibility for higher noise levels in the low frequency region due to abnormal conditions is also included. The second part of the report discusses the setting of noise limits for wind turbines. The applicability of excisting measurement scales is reviewed especially with respect to low-frequency noise. Finally the influence of wind speed on background noise level is discussed.

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 33518, 33585, 33587, 33588

33592 **(DOE/RL/10378—82/1) Response of the Mod-OA wind-turbine rotor to turbulent atmospheric wind.** Thresher, R.W.; Holley, W.E.; Hershberg, E.L.; Lin, S.R. (Oregon State Univ., Corvallis (USA). Dept. of Mechanical Engineering). Dec 1982. Contract AT06-82RL10378. 117p. NTIS, PC A06/MF A01. Order Number DE83011844.

The major focus of this paper will be the description of the fluctuating loads caused by the atmospheric turbulence. The wind turbulence inputs used in this study are determined in three basic modeling steps. First, the turbulent velocity field is characterized by a model which provides the correlation between velocity components at different spatial positions and at different times. Second, the velocity field is approximated in the rotor disk plane using a series expansion which includes terms that are uniform across the rotor disk, gradient terms which vary linearly across the disk, and terms which vary quadratically across the disk. All of these terms are time dependent. In the third step, simple rational spectral representations are determined which approximate the derived correlation model for these turbulence components. The Von Karman model is used to characteize the correlation between velocities at spatially separated points. Quasi-steady linear aerodynamic theory is used to compute the forces on the rotor blades of the Mod-OA wind turbine operating in a turbulent flow. The blade used for these computations is the fiberglass blade in place on the Mod-OA turbine as of November 1981. Using the combined turbulence and aerodynamic model the following rotor responses are computed: thrust, torque, pitch and yaw moments, and blade root bending moments. These computations were made for the case of fixed pitch operation and incorporate the influence of a linear mean wind shear. Results presented include power spectral density plots of the wind and turbine outputs described above for three different mean wind conditions. There is a comparison of the various responses to determine the relative importance of the turbulence inputs on rotor blade loads.

33593 **(Juel-Spez—155) Implementing agreement for a programme of research and development on wind energy conversion systems.** (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projektleitung Energieforschung). Jun 1982. 248p. (CONF-8203124—). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83750377.

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

Portions are illegible in microfiche products.

This proceeding contains the papers held on the 1982 meeting of experts. All papers deal with problems of integration of wind power into national electricity supply systems. Separate abstracts were prepared for the 10 papers in this report.

33594 (Juel-Spez—155, pp 25-49) **Wind turbine parks in electric utility systems.** Dub, W. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

All the results of the integration of wind power into utility systems points towards the application of parks of megawatt-size wind turbines. One of the important questions which need to be answered is how the present power system operating strategies might have to be altered in order to utilize the wind. This needs to be investigated as power system planning is a longterm procedure. The paper outlines the basic operational concept of a power system. Based on chronological hourly wind data, the variability of mean hourly wind power is assessed next. The effects of wind power output variations on the operation planning and the real time operation of the power system are discussed finally.

33595 (Juel-Spez—155, pp 51-58) **Swedish state power board.** Walve, K. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

In Sweden two large WECS of 2 and 3 MW size are under construction and are planned to be taken into operation in 1982. The following research programm till 1984 deals with the integration of the wind power in the future Swedish power system. Phase one of the integration studies has been carried out. The paper gives a summary of the analysis which has been carried out concerning variations of wind speed and power output in minute and hour-scale and the need of reserves in hydro power to meet the fluctuations. The results pointed out, that large wind power installations will require reserves in hydro power and thermal power that is easy to regulate. More peak units should be used instead of intermediate units.

33596 (Juel-Spez—155, pp 59-79) **Wind forecasting and some other aspects of wind information relevant to integration of WECS in the grid.** Bodin, S. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

Information about the wind is important when approaching the problem of integrating wind energy in the grid. When wind energy is produced wind forecasts become essential for daily and hourly scheduling of the unit commitment mix. The National Board for Energy Source Development in Sweden has sponsored research and measurement programs to provide the required information on power spectra and coherence at/between different places at planned hub heights and long time series of wind speed at several places to correctly simulate different power grids. The forecast methods for wind power networks are based on objective numerical forecast models run at the central weather offices. Research for improving forecast methods has started.

33597 (Juel-Spez—155, pp 83-135) **Statistical methods for the assessment of wind power integration into the electricity supply system.** Janssen, A.J.; Oei, T.D.; Dragt, J.B. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

The report summarizes the results of studies on system integration problems of wind power, conducted at ECN within the framework of the Dutch National Wind Research Program. Statistical methods, determining power supply reliability, were used to evaluate the conventional capacity that can be displaced by wind power. Characteristics of two standard wind turbines were used, together with wind data of four Dutch weather stations. System demand and conventional generating plant relevant to the Dutch grid were considered in the calculations. A statistical method was also used to point out trends with respect to possible fuel savings due to wind power integration and desirable changes in the conventional plant mix.

33598 (Juel-Spez—155, pp 137-187) **Frequency and duration method for the evaluation of wind integration.** Janssen, A.J. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

Integration of wind power into the electricity grid affects total consumption of the thermal supply system as well as total installed production capacity necessary for a reliable power supply. Both effects can be quantified with a probabilistic computer model based on the frequency and duration method. The theory of the method, applied to wind-assisted systems, is outlined. Supply reliability can be expressed in various reliability indices, e.g. loss-of-load probability and frequency of loss-of-load events. Calculation results show that the different indices are affected differently by wind power integration. Thermal capacity savings due to wind power are therefore somewhat dependent on the adopted reliability criterion. Furthermore, there is no unambiguous relation between wind energy production and the type of fuel that is saved. It is shown that even for high wind power penetration levels a reasonable freedom exists in thermal plant operating strategy to achieve savings in accordance with the prevailing fuel mix consumption policy.

33599 (Juel-Spez—155, pp 189-214) **Operating considerations in reliability modeling of wind-assisted utility systems.** Janssen, A.J. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

A frequency and duration model for reliability evaluation of wind-assisted utility systems is presented, with which various operating considerations and restrictions can be taken into account explicitly, such as thermal unit commitment policies, start-up failures, start-up times and outage postponability. Also the effects on system reliability of wind power (un)predictability and spinning reserve policies can be evaluated with the model. Some sample results are given. The capacity credit that may be assigned to wind power depends on the operating parameters of the thermal system and on the adopted operating strategy. It is shown that the wind power capacity credit calculated in the conventional way, i.e. without operating considerations, is not necessarily an upper limit.

33600 (Juel-Spez—155, pp 227-241) **Technical problems of WECS interconnection.** Stafford, R.W.; Park, G.L. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

The technical and institutional problems of adapting wind energy to utility systems are partly solved. Electric utilities must yet be cautious in adopting new sources, for the utilities are required to deliver a homogeneous product subject to stringent power quality and economic constraints. In North America there are at least 10 large WECS in operation with relatively few difficulties due to interaction with the local utility. The paper review first likely configurations for WECS, then the nature of WECS sources versus conventional sources and after this, the paper lists the major issues associated with large WECS, their status and reference available reports which address those issues. Next, issues associated with small wind energy power systems are identified and several critical ones are reviewed with reference to relevant studies.

33601 **(NE-VIND—81-7) Wind power plant with a low speed electric generator.** Nygren, I.; Grop, S.; Pettersson, B. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1981. 60p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750479.

Portions are illegible in microfiche products.

The technical and economical aspects of a wind power plant with a direct coupled low speed generator and a fast rotating generator with a gear box are compared with one another. The effect of the plant is 2.5 MW and a project study has been made of a

compact unit with the turbine and generator built together. The cost of energy has been estimated and the result is encouraging.

33602 **(NE-VIND—81-26) Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system.** Carlsson, O.; Hylander, J.; Hallenius, K.E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Aug 1981. 74p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750490.

Portions are illegible in microfiche products.

The paper discusses the extent of the variations of current and voltage when a 2.5 MW asynchronous electric generator is connected to the electric power distribution system. The phasing-in by means of condenser magnetization and the connection of the generator by external reactance is used. A non-linear theory which takes the saturation of the asynchronous machine into account is applied. The analysis of the methods shows that the magnetization by condensers is to be prefered when the distribution net is weak. For Naesudden, Gotland, the following variations are calculated: 3.5 per cent for condenser magnetization. 5.5 per cent for three-phase series reactance with interruption by steps. 8 per cent for three-phase series reactance with direct interruption. 13 per cent for two-phase connection with a one-phase series reactance.

33603 **(NE-VIND—82-4) Computer recording system for the assessment of the prototypes of wind power plants. Specified requirements.** (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Dec 1979. 97p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750498.

Portions are illegible in microfiche products.

General, functional and technical requirements as to the recording system which is to be used for the prototypes. The extent of the computerized data acquisition system is defined.

33604 **(NE-VIND—82-16) Constructional basis of the project NE 5061481 composite rotor of Kalkugnen.** Lundemo, C.; Lundgren, S.; Thor, S.E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). [nd]. 85p. (In Swedish). (FFA-AU—1440). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750539.

Portions are illegible in microfiche products.

It is intended to test a pair of rotor blades at the plant of Aelvkarleby (diameter 18 m). The optimization of blade geometry, dimensioning of loads, analysis of strength and vibration is discussed. The extreme load is calculated at wind velocity of 54 m/sec. A modified blade configuration yields 68 kW at 77 rotations per minute at wind velocity of 10 m/sec. The analysis has been made by the computer program BASIS 3. The result was a blade with the weight of 210 kg made of glass fibre with directional properties.

33605 **(NE-VIND—82-18) Calculation of blade-data for the Hamilton standard structural analysis of the composite blade for the 18 meter diameter rotor and a comparison with FFA-calculation.** Lundemo, C. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Apr 1979. 51p. (FFA-HU—2115). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750508.

Portions are illegible in microfiche products.

Section property data for the composite blade manufactured by Karlskronavarvet was calculated for the analysis performed by Hamilton Standard. The HS investigation was carried out for various operating conditions, including dynamic response loads, stresses, frequencies and dynamic stability. The Hamilton Standard results has been compared with the FFA (The Aeronautical Research Institute of Sweden) calculation. The results show that the stresses and moments calculated by HS never exceed the allowable levels for the hinged hub configuration. The natural frequencies seem to agree quite well with the measured frequencies. In the input data of the Hamilton Standard dynamic response analysis a too far aft position of the cordwise center of gravity of the outher third of the blade was used. Correct position will give lower stresses.

33606 **(NE-VIND—82-19) Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet.** Johnson, I.; Thor, S.E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Oct 1979. 29p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750509.

Portions are illegible in microfiche products.

Two wind turbine blades, of 9 meters length, have been designed by FFA (The Aeronautical Research Institute of Sweden) and manufactured by Karlskronavarvet. The blades have been tested at FFA to determine the stiffness and vibration characteristics. Good agreement between calculations and tests has been obtained for both deflections and natural frequencies. Deflections were within 8 per cent of calculated values. The lowest natural frequency was measured as 3.7 Hz and calculated was 3.8 Hz. Measured strains in the outer part of the blade were higher than calculated but well within allowable strains.

33607 **(NE-VIND—82-20) Safety of wind energy conversion systems with horizontal axis (HA WECS).** Eggwertz, S.; Carlsson, I.; Gustafsson, A.; Linde, M.; Lundemo, C.; Montgomerie, B.; Thor, S.E. . (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Feb 1981. 169p. (FFA-HU—2229). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750511.

Portions are illegible in microfiche products.

The study provides information on hazards imposed by a WECS on the general public and the operator personnel by complete collapse or by separation of fractured parts or pieces of ice, acting as missiles. Land based large-scale turbine systems with horizontal axis situated in area with sparse population are considered. Blade material is assumed to be steel, aluminium alloy or fiberreinforced plastics, the tower being built of steel or reinforced concrete. The aim of the investigation is to provide a preliminary manual for safety evaluation. The present report constitutes a revised and considarably extended version of FFA HU-2126, December 1979. Primary structure, function and failure modes are identified. Statistical information of loads and load combinations, strength properties of materials and geometry deviation are provided. A simplified method of risk analysis is described. The object and function of a safety system, both hardware and software, is reviewed, considering also effects of inspection and repair. A dynamic study of objects separating from turbine was performed in the earlier edition. The probability of being hit is evaluated provided a fracture occurs, and a risk zone is thus established.

33608 **(NE-VIND—82-22) Testing of a small Darrieus turbine. Final report.** Westberg, S.; Wier, P.U. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). [nd]. 51p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750504.

Portions are illegible in microfiche products.

The total efficiency of a small Darrieus rotor has been measured and the cost of manufacturing has been estimated. The price was found to be 12900 SEK each when making 1000 turbines and the cost of produced energy amounted to 0.46 SEK per kWh. The efficiency of the system was 30 per cent. A large plant would give a lower energy price than the small one which was investigated. The problems with vibrations would be reduced as well. The aerodynamic properties of the Darrieus rotor were found to be excellent.

33609 **(NE-VIND—82-25) Influence of the harmonics in rotor current on the wave shape of the stator voltage in a double-fed winddriven induction generator.** Hylander, J.; Carlson, O. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Mar 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750507.

Portions are illegible in microfiche products.

The double-fed induction generator can, compared with the standard synchronous and asynchronous generator, significant increase the energy output at some windpower sites with a low average windspeed. A converter has to be connected to the rotor, to create a current with a variable frequency. Harmonics on this current induce non-harmonic slip dependent harmonics on the stator current. Both practical experiments and computer simulations have

been done, to verify the basic theory presented. The investigation shows that the pulse width modulation methods could be used to reduce the rotor current harmonics. If a proper wave shape is used, no significant stator current harmonics will appear, which could cause voltage variation on a weak grid. The double-fed induction generator with its large speed range and controllable power factor promises some advantages in wind energy conversion, if harmonics induced on the stator current are eliminated.

33610 **(RFP—3358) UTRC 15-kW wind-system development. Phase II: fabrication and testing.** Cheney, M.C. (United Technologies Research Center, East Hartford, CT (USA)). Feb 1982. Contract AC04-76DP03533. 58p. NTIS, PC A04/MF A01. Order Number DE83012274.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This Phase II final report contains a description of the hardware fabrication and initial test results of a 15-kW wind turbine. The system represents a growth version of the 8-kW wind system incorporates many improvements over its predecessor and these should improve producibility and reduce operating costs. A test program was successfully completed, including performance measurements, which demonstrated the operational and performance characteristics of the prototype. The unit has been shipped to Rockwell International, and the test program will continue at the Rocky Flats Test Center, near Boulder, Colorado.

33611 **(RFP—3488) Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems.** Higashi, K.K.; Minges, G.P.; Price, G.D. (Rockwell International Corp., Golden, CO (USA). Wind Energy Research Center). Oct 1982. Contract AC04-76DP03533. 79p. NTIS, PC A05/MF A01. Order Number DE83012273.

The Rocky Flats Wind Energy Research Center has conducted research into the use of a wound-rotor variable-speed, constant-frequency generator with small wind systems. The main initial objective was to demonstrate proof-of-concept under controlled conditions. Testing confirmed the feasibility of this application and showed improved performance could be expected over a constant-speed, constant-frequency generator systems. The most-notable improvement was the ability to maintain a constant tip speed ratio near the maximum rotor performance coefficient over a wide range of wind speeds. This indicates a substantial increase in annual energy output could be expected from VSCF operation. Controlled start-up and shutdown can also reduce the high transient torques and concomitant inrush currents common to induction-generator systems. Additional testing is now underway to further explore the concept under ambient wind conditions and over a longer test period.

33612 **(RFP—3508) Horizontal-axis wind-system rotor performance model comparison: a compendium.** (Aerospace Systems, Inc., Burlington, MA (USA); AeroVironment, Inc., Pasadena, CA (USA); Oregon State Univ., Corvallis (USA); United Technologies Research Center, East Hartford, CT (USA)). Feb 1983. Contract AC04-76DP03533. 513p. NTIS, PC A22/MF A01. Order Number DE83012265.

Portions are illegible in microfiche products.

This compendium consists of four reports, the purpose of which is to evaluate performance prediction methods for horizontal-axis wind turbines. The reports were prepared by four separate contractors. Oregon State University, AeroVironment, Inc., Aerospace Systems, Inc., and United Technologies Research Center (UTRC). Three of the four contractors used a blade-element/momentum analysis, while the fourth (UTRC) utilized a lifting line/prescribed wake analysis. These contractors were to apply their prediction methods to two rotors, that of the Enertech 1500 and that of the 1/3-scale UTRC 8 kW turbines. Results from the four prediction methods are compared with actual test data gathered via Controlled Velocity Testing (CVT), carried out by the Rocky Flats Wind Energy Research Center, operated by Rockwell International for the US Department of Energy. The conclusions of the four reports are reviewed in an introduction prepared by Rockwell International. For the Enertech 1500, rotor performance predictions closely agreed with CVT data. Yet, because of the lack of high tip speed ratio data, verification of the Glauert momentum theory was not possible. Predictions regarding the UTRC 1/3 scale 8 kW rotor did not agree well with test results. The reasons cited for the discrepancies center on inadequate airfoil section data and the varying blade pitch angles of the unique UTRC flexbeam rotor.

33613 **(SAND—82-2543C) General method for fatigue analysis of vertical-axis wind-turbine blades.** Veers, P.S. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 8p. (CONF-830631—2). NTIS, PC A02/MF A01. Order Number DE83012226.

From 6. biennial wind energy conference; Minneapolis, MN, USA (1 Jun 1983).

Portions are illegible in microfiche products.

The fatigue life of wind-turbine blades, which are exposed to the random loading environment of atmospheric winds, is described with random data analysis procedures. The incident windspeed and the stresses caused by these winds are expressed in terms of probability density functions while the fatigue life vs. stress level relationship is treated deterministically. This approach allows the fatigue damage to be expressed as a function of wind speed as a damage density function. By examining some of the constraints on the variables in the damage density expression, some generalizations of the wind-turbine fatigue problem are obtained. The area under the damage density function is inversely related to total fatigue life. Therefore, an increase in fatigue life due to restricted operation in certain wind regimes is readily visualized. An on parameter which is the percentage of total time at each windspeed that the turbine actually operates is introduced for this purpose. An example calculation is presented using data acquired from the DOE 17-meter-turbine program.

33614 **(SAND—82-2552C) Wakes of isolated Darrieus turbines.** Akins, R.E. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 10p. (CONF-830631—1). NTIS, PC A02/MF A01. Order Number DE83011501.

From 6. biennial wind energy conference; Minneapolis, MN, USA (1 Jun 1983).

A knowledge of the flow structure in the wake of a wind turbine is important in the design of arrays of units to be used in wind-farm applications. In order to better understand this structure, an experimental program to measure the wake structure downwind of a 17m Darrieus vertical-axis wind turbine was completed. Mean-velocity deficits have been measured as a function of tip-speed ratio and incident wind direction for several downstream locations. The results will allow verification and modification of existing models and improve the capability to predict performance of clusters of wind turbines.

33615 **(UUIM—66) Investigating the Gill UVW-anemometer as a rugged turbulence instrument for wind power applications.** Faxen, T. (Uppsala Univ. (Sweden). Meteorologiska Institutionen). 1982. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750496.

Portions are illegible in microfiche products.

Simultaneous measurements of turbulent wind velocity fluctuations with the Gill UVW-anemometer and a hot wire anemometer are used to investigate the fitness for using the Gill anemometer in wind power applications. The measurements are from two levels and with two different propeller types = the 'traditional' polystyrene type and a new polypropylene type. Frequency response curves and distance constants for the three components and both propeller types are calculated and the effect of the limited frequency response on power spectra and variances is investigated. A good agreement is found between the manufacturers data on distance constants with the measured ones. A large calibration error in the w-component measurements with the Gill anemometer is found and difficult to explain. Significant differences in accuracy and frequency response are found between the two propeller types which limits the use of the polypropylene propeller.

20 ELECTRIC POWER ENGINEERING

2001 Power Plants And Power Generation

REFER ALSO TO CITATION(S) 32943, 33023, 33147, 33975

33616 (BMFT-FB-T—82-169) Development of heat exchangers for reheating scrubbed flue gas in a pilot plant. Michalak, S. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750115.

Portions are illegible in microfiche products.

Application of some reheating systems in flue gas desulphurization plants. Based on experiments carried out in the laboratory, the use of some reheating systems is studied. The following problems are taken into consideration: The influence of solid impurities in gas on the heat transfer coefficient, the different operational conditions to test clearing of the heat transfer surface, the rate of corrosion, the partial gas recirculation. Some undertakings are proposed to increase the heat transfer coefficient and removing of liquid drops. Questions connected with measurement technique, insulation and prevention of leakage are discussed.

33617 (BMFT-FB-T—83-008) Large industrial gas turbine for medium and peak load service. Jacobi, C.; Schuhmacher, K.H.; Sponholz, H.J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 61p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750858.

Portions are illegible in microfiche products.

A large, single shaft gas turbine has been developed for base load, middle and peak-load service, rated at a nominal power of 210 MW and a thermal efficiency of 32 percent. A substantial rise of the air mass flow has been achieved by means of a compressor with transsonic relative flow in the first couple of stages. An advanced cooling system is used in two out of three turbine stages, allowing to raise the turbine inlet temperature. The design is based on well proved concepts like a welded one piece rotor ans one large combustion chamber. New construction elements have been designed where necessary because of circumferential speed and size. A broad operational range has been aimed at.

33618 (DOE/OR/20837—T1) Case studies of electric-generating-plant demographics: efficiency and availability enhancements. Foster, J.L.; Penland, J.R.; Roll, C.R. Jr.; Hedges, K.A. (Science Applications, Inc., McLean, VA (USA)). Jan 1983. Contract AC05-81OR20837. 73p. NTIS, PC A04/MF A01. Order Number DE83011539.

Portions are illegible in microfiche products.

This paper summarizes the results of a series of case studies of utilities. The analysis reported is designed to illustrate and integrate the various issues that surround the potential capacity of the existing and planned electric generating capital stock. The study grew out of general policy concerns over the current lack of capital formation in the electric utility industry and the implications for electricity supply if demand were to increase at a rapid rate. The focus of the study, therefore, is on the current stock, its potential performance over time and how that capacity might be enhanced. In addition, potential new capacity and retirements are considered, as well as the more efficient use of existing capacity through pooling.

33619 (DOE/PE/70009—T1) Analysis of the disparity in electricity rates among electric utilities. (Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)). Jan 1983. Contract AC01-78PE70009. 114p. NTIS, PC A06/MF A01. Order Number DE83011529.

Portions are illegible in microfiche products.

The principal conclusion of this study is that differential increases in fuel costs by fuel type fundamentally altered the cost structure of the utility industry. These differences are the principal cause for the varying levels of increase in electricity rates. Results developed from detailed statistical and modeling analyses indicate that: (1) Utilities which continued, or increased, their dependence on oil-fired generation became the highest cost electricity producers. (2) Utilities which were oil dependent, but have decreased the percentage of oil used to generate electricity, have improved their relative position with respect to electric rate levels. (3) Utilities which were, and have remained, heavily dependent on coal, or coal and nuclear generation are the lowest cost power producers. (4) Systems which are heavily dependent on gas are moving from low cost to higher cost power producers - a trend likely to continue into the future.

33620 (DOE/PE/70009—T4) Comparison of the electric-utility industry with other major business sectors. (Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)). Nov 1982. Contract AC01-78PE70009. 49p. NTIS, PC A03/MF A01. Order Number DE83011532.

Despite significant increases in both product demand and revenues, the electric utility industry's financial health compares poorly with that of other major industrial sectors. The electric utility industry has expanded both production and revenues at a greater rate than for the average of all manufacturing industries. Most other industries with favorable market growth have achieved strong financial health. The electric utility industry has fared worse finanially than most other industries who have realized increased demand for their output. The reasons for this dichotomy lie in fundamental differences between the electric utility industry and other industries. These differences include price regulation, large capital requirements, and long construction lead times.

33621 (DOE/PE/70225—1) Characterization of foreign electric-utility experiences for potential useful applications in the US. (Bentz (E.J.) and Associates, Inc., Springfield, VA (USA); Burns and Roe Industrial Services Corp., Paramus, NJ (USA)). Dec 1982. Contract AC01-80PE70225. 139p. NTIS, PC A07/MF A01. Order Number DE83012366.

A review and comparison of foreign electric-utility experiences reveals that different nations actively endorse different levels of government activity in the generation and delivery of electric power. The degree and manner of endorsement and subsequent governmental activity reflects the perception of electric power in respective societies. These perceptions, in most of the reviewed, energy-poor industrialized societies, are based on an acute awareness of fuel-supply vulnerability. In these societies planning on how to respond and capability to respond and adapt quickly is essential to survival. A strong governmental role, exerting either direct control or exerting indirect control through financial incentives and penalties (subsidies, tax breaks, etc.) and active government participation in the development and implementation and contingency planning for fuel supply interruptions is the typical instrument to respond to external events and economics. The overall goal of foreign nation utility policies has been to provide for secure and reliable electric power into the future at reasonable rates to consumers. Among the key guiding features of government utility policy has been the recognition of power as a strategic resource, as well as the need to seek system-wide cost recovery through rate mechanisms, as well as indirect tax-based subsidies and direct financial concessions.

33622 (DOE/PE/70274—T1) Analysis of the electric-utility industry in the US: an overview of selected analyses assessing the financial health of the utility industry. (ICF, Inc., Washington, DC (USA)). Mar 1983. Contract AC01-81PE70274. 57p. NTIS, PC A04/MF A01. Order Number DE83011542.

Portions are illegible in microfiche products.

ICF has performed a series of analyses for DOE evaluating several aspects of the current and future financial condition of the electric utility industry in the US. These conditions were evaluated for several alternative views of the future economic and regulatory environment facing this industry. The purpose of this overview report is to summarize the key issues, assumptions, and findings developed in these analyses. The purpose of the ICF analyses was to investigate: (1) the current and possible future economic and financial conditions of the utility industry; (2) the national and regional cost and rate impacts of restoring financial health to the utility industry and selected case studies of three specific utility systems; (3) the economic and rate impacts of building additional utility power-

plants; (4) the relative costs of overbuilding versus underbuilding generating capacity; and (5) the death spiral hypothesis.

33623 **(DOE/PE/70274—T2) Analysis of the electric utility industry in the US: an assessment of the national and regional cost and rate impacts of restoring utility financial health.** (ICF, Inc., Washington, DC (USA)). Win 1982. Contract AC01-81PE70274. 161p. NTIS, PC A08/MF A01. Order Number DE83011536.

Portions are illegible in microfiche products.

The purpose of the analysis presented here is (1) to describe the current and expected future economic and financial conditions of the utility industry, and (2) to investigate the national and regional impacts on ratepayers and shareholders of alternative financial remedies to improve these conditions. In addition, the sensitivity of the industry's situation to both improved economic conditions and a alternative world oil prices is evaluated.

33624 **(DOE/PE/70274—T3) Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants.** (ICF, Inc., Washington, DC (USA)). Fal 1982. Contract AC01-81PE70274. 120p. NTIS, PC A06/MF A01. Order Number DE83011543.

Portions are illegible in microfiche products.

The purpose of this analysis is to examine the economic and financial implications of utilities seeking to defer or cancel new coal-fired or nuclear powerplants. This analysis is a companion product of other ICF analyses which examine the overall condition of the financial and economic situation of the electric utility industry in the US. As such, this analysis is limited in focus in that it examines the specific issue of the deferral or cancellation of new specific coal-fired and/or nuclear capacity, much of which is presently under construction. Related issues are addressed in the other analytic products and efforts presented in separate reports submitted by ICF and others to DOE.

33625 (INIS-mf—7475-Vol.B, pp vp) **Costs comparison of electric energy in Brazil.** Goncalves, D.; Menegassi, J. (Companhia Energetica de Sao Paulo (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.B).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

A cost comparison study of various sources of electric energy generation was performed using uniform analysis criteria. The results indicate higher costs for coal, followed by nuclear and hydro. It was verified that presently, large hydro-power plants can only be located far from the load centers, with increasing costs of hydro-power energy in Brazil. These costs become higher than the nuclear plant if the hydro plant is located at distances exceeding 1000 Km.

33626 (INIS-mf—7475-Vol.B, pp vp) **Cost evolution of electric energy in Brazil.** de Oliveira, A.; Contreras, E.C.A. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia); Gomes, F.M. (CEPEL, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.B).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

An analysis of electric energy costs in Brazil is presented. Hydro, coal and nuclear costs are analysed and the final conclusion seems to indicate that nuclear power plants are not economically interesting until the Brazilian electric capacity attains 110 GW average power.

2002 Environmental Aspects

REFER ALSO TO CITATION(S) 33019, 33022, 33023, 33024, 33025, 33026, 33027, 33028, 33029, 33030, 33031, 33032, 33033, 33034, 33035, 33036, 33037, 33038, 33039, 33040, 33041, 33042, 33044, 33045, 33046, 33047, 33048, 33049, 33050, 33051, 33052, 33053, 33054, 33055, 33061, 33960, 34398

2003 Power Transmission And Distribution

REFER ALSO TO CITATION(S) 33602, 34014, 34020, 34021, 34022, 34023, 34024, 34026, 34027, 34028, 34030, 34031, 34032, 34033, 34034, 34035, 34036, 34037, 34038, 34039, 34040

33627 **(BMFT-FB-T—82-164) Measuring system for high-power circuit breaker.** Minnich, A. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 17p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750068.

Under the agreement of the BMFT-Programme for energy research and technologies a complete system for measurement, storage and registration of all adequate data of a high-power circuit breaker necessary for the evaluation of its characteristics was developed. The advantage of the measuring system lies mainly in the contactless coupling and high resolution of the measurement recorder. Resolution of stroke is 0.5 mm or 0.2 degrees at a speed of up to 45 mps or 8.84 rad ps. operating time, this inherent delay is measured for the test breaker pole. For measuring the pressure, a piezoelectric recorder is used. All analogue data is digitalized and stored in 12bit words. Registration is done by means of an X-Y recorder or metalized paper recorder.

33628 (CONF-820331—, pp 103-118) **Non-uniform field breakdown: engineering models.** Oakeshott, D.F. (Central Electricity Research Labs., Leatherhead, England); Waters, R.T. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

A new approach is given to modelling of corona attenuation and distortion of surges on overhead lines; examples are presented of the estimation of flashover voltages of air gaps in engineering structures and comparison is made with test data.

33629 (CONF-820331—, pp 199-209) **Practical problems of impulse breakdown requiring a physical approach.** Carrara, G.; Gallucci, F.; Manganaro, S.; Pigini, A. (CESI - Centro Elettrotecnico Sperimentale Italiano, Milan, Italy). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper analyzes how a physical approach may help to improve the knowledge in several fields of engineering application. Examples are made with reference to the following areas: sparkover probability in the low probability range; effect of atmospheric characteristics on the sparkover voltage of air gaps; lightning discharges to overhead lines; sparkover volt-time curves; and lightning impulse dielectric strength of vacuum circuit breakers.

33630 (CONF-820331—, pp 229-235) **Parameters influencing the switching surge strength of transmission line air insulation.** Kromer, I.L. (Inst. for Electrical Power Research, Budapest, Hungary). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The paper summarizes the results of a research program on the switching surge performance of phase-to-earth and phase-to-phase transmission line insulation, carried out in the last few years. The main purpose of the present work was to link the already available data in order to get a general description of the discharge parameters influencing the insulation strength. The effects of several variables, such as stress parameters and gap geometry were investigated. Special attention was paid to parameters affecting the leader development. The implications of these results for predicting the breakdown characteristics enable a better insight into the possibilities of air insulation.

33631 (CONF-820331—, pp 237-241) **Air insulation behaviour under oscillating impulses.** Baldo, G.; Pesavento, G. (Padua Univ., Italy). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Air insulation behavior under oscillating impulses with frequencies in the range 100 divided by 700 kHz has been investigated. The discharge exhibits the usual leader-streamers structure but it is modulated at the same frequency of the applied voltage. At every cycle the leader starts and stops again when the average field across the streamer zone is of the order of 5 kV/cm. Field reversal is observed in the channel due to the decay of the voltage and a back discharge is established. After the minimum, new ionization processes take place re-establishing previous field distribution so that streamers start again: their arrival at the plane occurs at a voltage level which is approximately the same as that which had caused the leader stop during the previous cycle.

33632 (CONF-820331—, pp 244-250) **Comments on the Carrara-Thione breakdown model of long air gap during positive switching surges.** Tong, Y.T.; Chen, Y.C.; Chan, I.C.; Lou, Y.L. (Shanghai Jiao-Tong Univ., China). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper discusses the two criteria given by Carrara and Thione in their well-known critical radius theory in long gap discharges and attempts to put forward amendments to their criteria so that the physical interpretation and the calculation are improved.

33633 (CONF-820331—, pp 259-266) **Voltage-time characteristics of breakdown in SF_6.** Dale, S.J. (Westinghouse Electric Corp., Trafford, PA); Wagenaar, L.B. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The voltage-time characteristics for a number of electrode configurations in SF_6 are reported, including a 9 m long, 550 kV semi-flexible compressed gas insulated transmission line (CGIT) section. The V-t characteristic for breakdown is flatter for gaps containing insulators without shielding electrodes and for dielectric coated electrodes than for bare electrodes.

33634 (CONF-820331—, pp 332-336) **Negative polarity dc breakdown of rod/plane gaps up to 1 MV, as affected by protrusions from the plane.** Allibone, T.E.; Saunderson, J.C. (City Univ., London, England). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Breakdown betwen electrodes of various shapes is more erratic on negative polarity than on positive. Photographic observations of sparkover up to 1 MV dc show that the cause of this is to be bound in the dominant character of the positive leader-stroke and the variable character of the negative. In a rod/plane gap the negative leader is invariably met by a positive leader rising from the plane and imperfections of the plane enhance this leader's growth; the sparkover voltage (s.o.v.) of the gap falls rapidly as the height of the protrusions from the plane increases, ultimately becoming nearly equal to the positive s.o.v. of the gap.

33635 (CONF-820331—, pp 337-348) **Surface flashover of gas/solid interfaces.** Cooke, C.M. (Massachusetts Inst. of Tech., Cambridge). 1982. NTIS, PC A25/MF A01. Contract W-7405-ENG-26.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Surface flashover along a gas/solid interface is an important limiting factor for the withstand voltage and the reliability of compressed-gas-insulated equipment. The flashover process may be viewed as comprised of two parts: inception and propagation. Both of these have been studied and are shown to be influenced by the applied field and its perpendicular and tangential components at the insulator surface. Surface electric charge accumulations and contaminate particles are thus found to be influential when they significantly perturb the surface fields. The flashover path will follow the surface from electrode to electrode, or, when perpendicular component fields are high, may jump from the surface through the gas or into the solid itself. Experimental results in systems where the applied surface field distribution was controllable are used to confirm the basic phenomena and models.

33636 (CONF-820331—, pp 356-364) **Development of surface charges on epoxy resin spacers stressed with direct applied voltages.** Knecht, A. (Swiss Federal Inst. of Tech., Zurich, Switzerland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The behavior of cylindrical epoxy resin spacers between parallel-plate electrodes with variously shaped electrode-spacer junctions was investigated in SF_6 and N_2. dc-voltages up to 500 kV have been applied for test periods ranging up to several days. Apart from studying the influence of flashover voltage on spacers, the main investigations are concentrated on the development and life time of surface charge accumulation and its influence on the field distribution. The charge accumulation was measured with a tiny field-mill system with good local resolution. A rather inhomogeneous charge distribution was found. A tendency for accumulation of charges at places of high radial surface field components could be detected. Compared to the case without using spacers, a pronounced reduction in flashover voltage was observed. This may be explained by the presence of the surface charges. Also long life times of charges could be recorded.

33637 (CONF-820331—, pp 365-373) **Charge accumulation on spacer surface at dc stress in compressed SF_6 gas.** Nakanishi, K.; Yoshioka, A.; Shibuya, Y.; Nitta, T. (Mitsubishi Electric Corp., Amagasaki, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The charge accumulation on the surface of an epoxy spacer is studied at dc stress in compressed SF_6 gas, using cylindrical model spacers with metal inserts at both ends. The accumulated charge is measured in compressed SF_6 gas by the probe which is placed in a test vessel. Dust figures are also used to observe the pattern of accumulated charge. Heterocharge accumulates on the circumference of a spacer and saturates itself in 5 hours at 100 kV dc. The charge distribution hardly decays for a long time after the removal of dc voltage and remains unchanged even after the exposure to the air. Three patterns of dust figures are observed on spacers. One of them appears even at relatively low voltages and is insensitive to applied voltages. In the other two patterns, charge accumulates in proportion to the applied voltage. Charge accumulates rather uniformly on a silica-filled spacer, while it deposits on the local area of a spacer filled with alumina. Charge accumulation phenomena are assumed to be determined by the electrical conduction on the surface of a spacer. The charge distribution analyzed by the surface electrical conduction agrees with that in the experiment.

33638 (CONF-820331—, pp 374-378) **Electrostatic field evaluation by the electrolytic tank method.** Sudarshan, T.S.; Nagabhushana, G.R.; Thompson, J.E.; Salisbury, K.; Park, L.R. (Univ. of South Carolina, Columbia). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Results of an analog method, using electrolytic tank models, are reported for insulators in the form of truncated cones. These results show the effects of the insulator shape and dielectric mismatch on the electric (E) field distributions.

33639 (CONF-820331—, pp 379-385) **Surface discharge in SF_6.** Niemeyer, L.; Pinnekamp, F. (Brown Boveri Research Center, Baden, Switzerland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Although discharge phenomena on insulator surfaces are the subject of many empirical studies, their basic physical mechanisms are still incompletely understood. This is particularly the case in electronegative gases. In order to contribute to this understanding we have experimentally studied a surface discharge arrangement in SF_6 under well defined geometrical conditions and widely varied discharge parameters. Space and time resolved diagnostics yield a set of data that serve as a base to construct a simplified model of discharge propagation. This model is based on order of magnitude estimates of the relevant physical processes involved in the dis-

charge process, namely electric field and charge conservation, ionization processes, conduction mechanism in the discharge channel and channel propagation mechanism. The model correctly describes the propagation length of a discharge channel as a function of the applied voltage, polarity, gas pressure and geometry.

33640 (CONF-820331—, pp 402-409) **Corona-induced decomposition of SF_6.** Van Brunt, R.J.; Leep, D.A. (National Bureau of Standards, Washington, DC). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The stable, neutral decomposition products resulting from positive point-plane dc corona in static SF_6 gas have been identified with a gas chromatograph-mass spectrometer. Absolute concentrations of some species have been measured with a sensitivity of ~ 1 ppM as a function of total energy dissipated for discharge power levels between 50 and 700 MW. The first detectable gaseous contaminant to appear is H_2O, presumably liberated by discharge-induced desorption from the electrode. The oxyfluorides SOF_2, SO_2F_2, and SOF_4 are the next most prominent species to appear. Other species such as CO, CO_2, CF_4, OCS, and SO_2 were identified. For corona levels below 700 MW, SOF_2 and SO_2F_2 appear with nearly equal concentrations, and the production rates for both are constant and proportional to discharge power. The presence of trace amounts of H_2O and other decomposition products is found to have a pronounced effect in suppressing the pulse burst characteristic of positive corona in SF_6.

33641 (CONF-820331—, pp 439-448) **Wideband digital correlator for partial discharge location in GIS.** Boggs, S.A.; Fujimoto, N.; Stone, G.C. (Ontario Hydro Research, Toronto). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Under EPRI sponsorship, a wideband digital correlator has been developed and applied to partial discharge location in gas-insulated transmission lines (GITL). The application to gas-insulated substations (GIS) is presently under study. The basic operation of the correlator and the application to GIS are described.

33642 (CONF-820331—, pp 449-455) **Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing.** Anis, H.; Srivastava, K.D. (Univ. of Waterloo, Ontario). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

In insulation research and unconventional testing, for example, insulation testing wit two superimposed voltages, a need may arise for a triggered spark gap with both its electrodes at a high voltage. A trigatron arrangement is described in which a 14 kV trigger pulse is generated within one of the electrodes. The trigger sequence is initiated by a photo-sensitive circuit, which is activated by a light beam from ground level. Triggering characteristics of two spark gap designs are described for main gap voltages up to 300 kV. A full description is given of a specific application where a single high voltage ac transformer is used to test compressed gas insulation under combined ac and switching impulse voltages. The time-lags and jitter, encountered between the firing pulse and the breakdown of the main gap, are also discussed.

33643 (CONF-820331—, pp 456-465) **Fast transient overvoltages in GIS caused by the operation of isolators.** Yoshizumi, T.; Matsuda, S.; Nitta, T. (Mitsubishi Electric Corp., Amagasaki, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Operations of an isolator in GIS generate fast transient overvoltages due to the reflections of potential front in the system. The overvoltages may be hazardous for the insulation of GIS particularly for high voltage systems where reduced LIWL is applied. The fast transient overvoltages are measured on a prototype uhv isolator with gas insulated bus of about 10 meters in length. The results of the measurement are compared with the computer analysis using Electro Magnetic Transient Program (EMTP). Modeling technique of GIS and the factors to be influential in the phenomena are studied in the analysis. The impact of the fast transient on the insulation coordination of GIS is also discussed.

33644 (CONF-820331—, pp 466-473) **Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint.** Hauschild, W. (VEB Transformatoren- und Roentgenwerk, Dresden, Germany); Jahn, H.; Mosch, W.; Lemke, E.; Speck, J. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The possible defects in SF_6 insulated systems (GIS) were classified and simulated by experiments. The breakdown impulse voltage is more reduced by fixed defects than the ac breakdown voltage, because at ac voltage the disturbed electric field is stabilized by partial discharges (p.d.). The p.d. inception voltage is reduced for any kind of test voltage. The breakdown impulse voltage is not affected by free-moving particles. However, in opposition to this the ac p.d. inception and breakdown voltages show a significant reduction. From such a physical viewpoint, the best method to find defects in SF_6 insulations is an ac voltage test connected with a wide-band p.d. measurement. Then the cause of the p.d. can be determined, because the character of p.d. generated by particles is quite different from that of fixed defects. From a technical viewpoint, the execution of such a p.d. test at GIS can be done without problems in the test lab of the factory. A p.d. test on site at GIS can only be recommended for SF_6 systems with operating voltages $\leqq 245$ kV. For higher voltages an ac conditioning and a test with oscillation impulse voltage should be used.

33645 (CONF-820331—, pp 475-483) **Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes.** Kuwahara, H.; Tanabe, T.; Sasamoto, S.; Nitta, T. (Mitsubishi Electric Corp., Amagasaki, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The performance and the reliability of gas-insulated equipment are discussed on the basis of data collected in the past 17 years of experience. The complaints and the troubles have constantly been fed back to improve the design and the manufacturing processes of the equipment. The data collected in the internal inspections and maintenance work on normally operating equipment have proved of a very reliable nature to gas insulation. Some of the practical problems in the internal works on gas-insulated equipment on site are also discussed.

33646 (CONF-820331—, pp 484-491) **Effect of restriking spark on dielectric strength to ground in a model gas insulated disconnecting switch.** Fujinami, H.; Takuma, T.; Aoshima, Y. (Central Research Inst. of Electric Power Industry, Tokyo, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This report describes the dielectric strength of a model gap arrangement to ground which simulates a disconnecting switch in GIS. The effect of a local spark on the dielectric strength has been experimentally investigated. The mechanism by which a local spark leads to breakdown to ground is discussed also.

33647 (CONF-820331—, pp 492-499) **77kV new type all-in-one SF_6 gas-insulated switchgear.** Harumoto, Y. (Kansai Electric Power Co., Inc., Osaka, Japan); Kusumoto, S.; Sugiyama, H. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper describes a newly developed SF_6 gas-insulated switchgear. All components including circuit breaker, disconnecting switches, connecting busbars, lightning arrester, cable potheads, etc., are enclosed in one cubic enclosure pressurized at very close to atmospheric pressure. Insulating performance tests at 0 bar SF_6 gas pressure were carried out with various shape of electrodes. A six-month long-term overvoltage test was also carried out to demonstrate the life of insulating materials and the frequent and intermittent operations of the switchgear with one complete circuit model of new type switchgear. The construction and space-saving

features of the switchgear compared with conventional type GIS with high pressure SF_6 gas are also described.

33648 (CONF-820331—, pp 500-508) **Transient breakdown in SF_6 gas-impregnated polymer film structures.** Reed, C.W. (General Electric Co., Schenectady, NY); Atkins, J.M.; Schneider, H.M. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

New comcepts for a gas-insulated power transformer include a very compact winding construction, comprised of sheet conductor insulated with polymer film and impregnated with SF_6 gas. Transient analysis studies on an instrumented coil indicate that this construction will have an inherently uniform internal electric stress distribution when subjected to transient voltages. Measurements of breakdown on model windings using transient voltages with rise times from 1.5 to 250 μs demonstrate very favorable performance, particularly at the longer rise times; this is attributed to the excellent dielectric strength of the polymer film.

33649 (CONF-820331—, pp 527-532) **Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line.** Asada, Y. (Furukawa Electric Co., Ltd., Tokyo, Japan); Inaoka, K.; Hirose, M. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Problems on the materials and construction of SF_6 gas-pressurized lapped-polypropylene cable were mainly investigated to prevent the cable from deteriorating in electrical properties caused by thermal or mechanical stress applied to the cable. Biaxially oriented PP film (130 ~ 200 μm thick) with fibrillated surfaces was used for insulation and in order to suppress the lowering of discharge inception voltage caused by loading cycles, aluminum-evaporated PP film which has the same thermal expansion coefficient as that of insulation was adopted for the inner and outer shielding layers. The partial discharge inception stress of 275 kV PPGF cable was in agreement with the theoretically highest-possible value in the butt spaces which exist in the insulation layer, and an impulse breakdown stress of more than 100 kV/mm was obtained.

33650 (CONF-821235—1) **Power-system security assessment and control.** Wu, F.F. (California Univ., Berkeley (USA). Dept. of Electrical Engineering and Computer Sciences). 1982. Contract AC01-79ET29364. 12p. NTIS, PC A02/MF A01. Order Number DE83011426.

From International symposium on electrical power engineering; Taipei, Taiwan (18 Dec 1982).

A state-of-the-art survey of current methodology and practices in deterministic steady-state security assessment and enhancement is given. The need for probabilistic dynamic security assessment is explained. A unified approach to steady-state and dynamic security assessment in terms of steady-state and dynamic security regions is presented. The generalization to probabilistic security assessment is presented. A stochastic optimal control approach to security control is described and a solution algorithm is proposed.

33651 (CONF-830464—1) **Interconnection problems associated with small dispersed electric generators and inverter devices.** Jewell, W.T.; Rizy, D.T. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83012065.

From 14. annual modeling and simulation conference; Pittsburgh, PA, USA (21 Apr 1983).

Portions are illegible in microfiche products.

This paper describes the simulations of electric-utility distribution systems with dispersed generation systems, such as solar-photovoltaic and wind-generator systems, supplying power to the utility system. Problems caused by dispersed systems, such as potential damage to the utility system and lowering of power quality, were studied. The results provide guidance in the use of such dispersed systems.

33652 (CONF-830543—1) **Study of nonlinear oscillations due to exciter control using Hopf bifurcation.** Abed, E.; Tsolas, N.; Varaiya, P. (California Univ., Berkeley (USA)). 1983. Contract AC01-82CE76221. 5p. NTIS, PC A02/MF A01. Order Number DE83011293.

From IEEE international symposium on circuits and systems; Los Angeles, CA, USA (2 May 1983).

Portions are illegible in microfiche products.

The effect of excitation system parameters on power system stability is studied here. The classical swing equation for a power generator augmented with an exciter is shown to undergo a Hopf bifurcation to periodic solutions. Only unstable oscillations occur for realistic parameter values and characterize the attractor of the stable equilibrium point. Attention is focussed on the global behavior of the oscillations as the critical parameter is varied. The analysis is carred out for a single machine connected to an infinite bus case.

33653 (CONF-830543—2) **Analysis of linearized decoupled power-flow approximations for steady-state security assessment.** Kaye, R.J.; Wu, F.F. (California Univ., Berkeley (USA)). 1983. Contract AC01-79ET29364. 4p. NTIS, PC A02/MF A01. Order Number DE83011428.

From IEEE international symposium on circuits and systems; Los Angeles, CA, USA (2 May 1983).

An analytic study of various approximations of the power-flow equations for electric-power systems is presented. The approximate models examined are the decoupled power flow, and the adjoint-network sensitivity model, which are commonly used in steady-state security assessment. Error bounds on the difference between the solution of each of the approximate models and the solution of the full power flow are derived.

33654 (CONF-830628—1) **Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach.** Kaye, R.J.; Wu, F.F. (Australian National Univ., Canberra. Inst. of Advanced Studies; California Univ., Berkeley (USA)). 1983. Contract AC01-82CE76221. 6p. NTIS, PC A02/MF A01. Order Number DE83011292.

From American control conference; San Francisco, CA, USA (22 Jun 1983).

The problem of generation scheduling for an electric power system with random load and transmission system disturbances is considered. Using security regions, both the steady-state and dynamic performance of the system is accounted for. The measure of security of the system is expected time to insecurity and an iterative technique for constructing a sequence of schedules is given, such that they approach the optimal.

33655 (CONF-830628—2) **Analysis of power flows without solving power flow equations.** Wu, F.F. (California Univ., Berkeley (USA)). 1983. Contract AC01-79ET29364. 2p. NTIS, PC A02/MF A01. Order Number DE83011425.

From American control conference; San Francisco, CA, USA (22 Jun 1983).

The purpose of solving power-flow equations is examined. Our work on the analysis of power flows without solving power-flow equations is reviewed. The application of the results and further extension of the ideas to security assessment and control are also mentioned.

33656 (CONF-830628—3) **Analysis of linearized decoupled power-flow approximations for steady-state security assessment.** Kaye, R.J.; Wu, F.F. (California Univ., Berkeley (USA)). 1983. Contract AC01-79ET29364. 56p. NTIS, PC A04/MF A01. Order Number DE83011427.

From American control conference; San Francisco, CA, USA (22 Jun 1983).

An analytic study of various approximations of the power-flow equations for electric-power systems is presented. The approximate models examined are the decoupled power flow, the linearized decoupled power flow (including the dc load flow) and the adjoint-network sensitivity model, all of which are commonly used in steady-state security assessment. Error bounds on the difference between the solution of each of the approximate models and the solution of the full power flow are derived. The results are applied to

the steady-state contingency analysis problem, resulting in a proposed new approach to the problem.

33657 **(CONF-830628—4) Study of nonlinear oscillations due to exciter control.** Abed, E.; Tsolas, N.; Varaiya, P. (California Univ., Berkeley (USA)). 1983. Contract AC01-82CE76221. 5p. NTIS, PC A02/MF A01. Order Number DE83011289.

From American control conference; San Francisco, CA, USA (22 Jun 1983).

Portions are illegible in microfiche products.

The effect of excitation system parameters on power system stability is studied here. The classical swing equation for a power generator augmented with an exciter is shown to undergo a Hopf bifurcation to periodic solutions. Only unstable oscillations occur for realistic parameter values and characterize the attractor of the stable equilibrium point. Attention is focussed on the global behavior of the oscillations as the critical parameter is varied. The analysis is carried out for a single machine connected to an infinite bus case.

33658 **(DOE/ET/29297—2) Technical and economic characteristics of high-phase-order power transmission.** Douglass, D.A.; Grant, I.S.; Kallaur, E.; Stewart, J.R.; Wilson, D.D. (Power Technologies, Inc., Schenectady, NY (USA)). Mar 1983. Contract AC01-78ET29297. 222p. NTIS MF A01. Order Number DE83012613.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

In 1978, the US Department of Energy sponsored a project for development of analytical design methods and testing of experimental six- and twelve-phase lines. The objectives were to develop promising design concepts, extend to high phase order the complex predictive and design calculations for radio noise, audible noise, electric fields, and conductor motions, and to demonstrate that practical and economic designs are presently available. The following areas are discussed in this report: (1) structures for the test lines; (2) insulator designs; (3) insulating midspan spacers; (4) power supply substation; (5) high phase order line impedances; (6) corona and field effects; (7) conductor motion due to ice shedding, fault currents, and wind; (8) lightning performance; (9) uprating existing double circuit lines; (10) economics of high phase order; (11) sample line designs; (12) national electrical safety code; and (13) future applications.

33659 **(DOE/NBB—0033) Program plan for research and development of technologies and systems for electric-power systems under the influence of nuclear electromagnetic pulses.** (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 11p. NTIS, PC A02/MF A01. Order Number DE83011929.

This document provides a comprehensive description of the DOE/EES EMP program. The program consists of five major elements designed to provide the technologies necessary to achieve national security objectives and to reduce the possibility of major disruptions to electric power systems. It includes experimentation, the application of refined state-of-the-art analytical methods, and the development of advanced models and concepts. Brief reviews of EMP phenomenology and the need for technologies and systems to assess and protect electric power systems are presented in subsequent sections of this document. These reviews are followed by a description of the DOE/EES EMP program plan.

33660 **(EPRI-EL—2943-CCM) Longitudinal unbalanced loads on transmission-line structures: documentation of computer programs BRODI2 and BROFLX.** Mozer, J.D. (GAI Consultants, Inc., Monroeville, PA (USA)). Feb 1983. 160p. NTIS, PC A08/MF A01. Order Number DE83901922.

This report is a documentation for two computer programs for calculating longitudinal unbalanced loads on transmission line structures. The effort involved several modifications to the computer program BRODI1 and the development of an auxilliary computer program, BROFLX, to aid in the preparation of input data. The revised program, BRODI2, provides the additional capabilities of analyzing for longitudinal unbalanced loads in line systems with elevation differences between supports, different properties for each wire, and horizontal-vee type insulators. The auxilliary computer program, BROFLX, can be used to compute an approximate structure flexibility matrix for certain types of structures, to compute equivalent wind loads to simulate wind on the structure, and to calculate a modified flexibility matrix which accounts for the P-Delta effect. This documentation provides a description of each of these computer programs with a discussion of the theory relevant to their development. The input data is described in detail along with a series of sample problems to demonstrate the use of each program and its options. The FORTRAN IV Source Listing is included for each program and its subroutines.

33661 **New tools to cut labor costs.** Lihach, N.; Kendrew, T.; Rodenbaugh, T.; Steiner, R.; Tackaberry, R. *EPRI (Electric Power Research Institute) Journal;* **8**: No. 2, 14-17(Mar 1983).

The Electric Power Research Institute is developing new techniques that will reduce the labor costs of building and maintaining power-distribution systems. The new tools include a cable plow for underground cables, concrete cutters, an underground borer, tree growth retardants, and other devices which reduce labor requirements and cause less environmental disruption. 2 references. (DCK)

21 NUCLEAR POWER PLANTS

33662 **(CONF-830446—3) In-plant reliability data system (IPRDS) - a utility-oriented data base.** Borkowski, R.J.; Kahl, W.K. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 9p. NTIS, PC A02/MF A01. Order Number DE83012069.

From American Power conference; Chicago, IL, USA (18 Apr 1983).

Currently, there are data from six operating units comprising four nuclear power plants in the data base. There are an additional seven units (4 plants) that are ready for data collection and encoding. Overall, approximately 120,000 maintenance records have been reviewed and 24,000 records of corrective maintenance actions have been extracted. The components for which data encoding has been completed include pumps and valves. The pump data base contains 1468 pumps and 3100 maintenance records on these pumps spanning almost 24 reactor-years of commercial operation. An additional 900 pump maintenance records for years prior to commercial operation have also been entered. The valve data base contains 24,825 valve population records and approximately 5800 valve maintenance records.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 33670, 33703, 33730, 33738, 33748, 33749, 33752, 33755, 33756, 33758, 33759, 33767, 33768, 33769, 33771, 33774

33663 **(BMFT-FB-K—82-003) Improvement of reactor physics design methods for plutonium recycling in boiling water reactors.** Ambrosius, G.; Strohbach, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 81p. (In German). NTIS (US Sales Only), PC A78/MF A01. Order Number DE83750060.

Compared with uranium fuel elements the utilization of plutonium in boiling water reactors - especially in the form of an island of plutonium rods surrounded by uranium rods in the same fuel element - requires a more exact treatment of the heterogeneous structure and strong spectral interaction especially at the resonance of Pu240. The code BPSPU, newly developed within this project, fulfills this task for future design calculations. It has also benefits for uranium fuel elements because of the buildup of plutonium. The quality of the 3d core calculation has been tested with a gamma scan of a core with plutonium fuel elements.

33664 **(BMFT-FB-K—82-004) Improvement of plutonium recycling in boiling water reactors by irradiation experience and experiments.** Pohl, P.; Costescu, J.; Morschel, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750098.

Improving plutonium recycling in BWR's, measurements were performed at the reactor KRB-A on reactivity changes and reactivity-coefficients. One irradiated Pu-FA was examinated by gamma spectroscopy rod by rod in different axial positions. Within the frame of Garigliano-KRITZ-experiments one MOX'FA was simulating the Pu-FA-type of KRB-A. The results showed no significant changes in behaviour compared to uranium reloads.

33665 **(NUREG/CR—3228-Vol.1) Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1.** (Materials Engineering Associates, Inc., Lanham, MD (USA)). Apr 1983. 104p. (MEA—2012-Vol.1). NTIS, PC A06/MF A01 - GPO $5.50. Order Number DE83902052.

Portions are illegible in microfiche products.

The objective of this research program is to characterize material behavior in relation to structural safety and reliability of pressure-boundary components for light-water reactors. Specific objectives include developing an understanding of elastic-plastic fracture and environmentally-assisted crack-propagation phenomena in terms of continuum mechanics, metallurgical variables, and neutron irradiation. Emphasis is placed on identifying metallurgical factors responsible for radiation embrittlement of steels and on developing procedures for embrittlement relief, including guidelines for radiation-resistant steels. The underlying goal is the interpretation of material-properties performance to establish engineering criteria for structural reliability and long term operation. Current work is organized into three major tasks: (1) fracture-mechanics investigations, (2) environmentally-assisted crack growth in high-temperature, primary reactor water and (3) radiation sensitivity and postirradiation properties recovery. Research progress in these tasks for 1982 is summarized.

2102 Power Reactors, Non-breeding, Light-water Moderated, Non-boiling Water Cooled

REFER ALSO TO CITATION(S) 33186, 33665, 33696, 33698, 33702, 33703, 33709, 33730, 33738, 33742, 33743, 33744, 33745, 33746, 33748, 33749, 33750, 33753, 33754, 33755, 33758, 33759, 33764, 33765, 33767, 33771, 33775

33666 **(BMFT-FB-K—82-002) Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant.** Porsch, D.; Schlosser, G.; Uyttendaele, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 62p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750062.

Since 1972 an extensive demonstration program on recycling of plutonium has been realized at the Obrigheim power plant (KWO). In the scope of this program it was demonstrated that there are no problems in reactor operation even for greater numbers of mixed-oxide fuel assemblies (MOX-FA). All 29 MOX-FA inserted up to now showed an excellent irradiation behaviour. The reliability of the computer codes applied has been verified by experiments. The KWU know-how allows a large scale loading of MOX-FA in PWR.

33667 **(BMFT-FB-K—82-006) Qualification of the fuel technology for the plutonium recycling in light water reactors.** Schlemmer, F.; Manzel, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 36p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750099.

ALKEM developed different processes for the fabrication of UO_2/PuO_2 fuel with an improved solubility in nitric acid. As starting materials dry PuO_2 powder or liquid Pu nitrate can be used. For reactor qualification 52 fuel rod segments (10 'Granulate I', 21 'Granulate II', 21 'A(U/Pu)C') have been fabricated and assembled to 10 segmented fuel rods. These have been inserted into different KWO-MOX-carrier fuel assemblies for irradiation, 2 in 1977, 3 in 1978 and 5 in 1980. The segemented fuel rods have reached a burnup between 6.1 and 25.5 GWd/t(M) without defects by the end of February 1981. Irradiation of the segmented fuel rods is continued.

33668 **(BNL-NUREG—32798) Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions.** Newman, R.C.; Roberge, R.; Bandy, R. (Brookhaven National Lab., Upton, NY (USA)). Apr 1982. Contract AC02-76CH00016. 24p. (CONF-8204128—1). NTIS, PC A02/MF A01. Order Number DE83011358.

From ASTM conference on environment-sensitive fracture: evaluation and comparison of test methods; Washington, DC, USA (1 Apr 1982).

Portions are illegible in microfiche products.

In late 1981, widespread leakage was encountered in Alloy 600 steam-generator tubing at the Three Mile Island Unit 1 nuclear power plant. The phenomenon was identified as low-temperature intergranular stress-corrosion cracking (SCC) initiated from the inner surfaces of the tubes exposed to the primary coolant. A testing program was initiated to examine the material and environmental factors relevant to these failures, which were found to be associated with sensitization of the material and contamination of the coolant by air and sodium thiosulfate. The test solutions contained 1.3% boric acid with various additions of sulfur compounds and lithium hydroxide. Constant extension rate testing was used as the primary tool to examine environmental effects such as the inhibition of cracking by lithium hydroxide. Important effects of crack-initiation frequency on the specimen potential (and therefore crack velocity) are demonstrated.

33669 (INIS-mf—7475-Vol.A, pp vp) **Design of a pressurized water loop heated by electric resistances.** Ribeiro, S.V.G. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A19/MF A01. (CONF-8104136—Vol.A).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

A pressurized water loop design is presented. Its operating pressure is 420 psi and we seek to simulate qualitatively some thermo-hydraulic phenomena of PWR reactors. The primary circuit simulator consists basically of two elements: 1)the test section housing 16 electric resistences dissipating a total power of 100 Kw; 2)the loop built of SCH40S 304L steel piping, consisting of the pump, a heat exchanger and the pressurizer.

33670 (INIS-mf—7475-Vol.C, pp vp) **Freon Rig design for performing heat transfer experiments for nuclear reactors fuel bundles.** Flores, L.F.V. (Escola Federal de Engenharia de Itajuba, Minas Gerais (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.C).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

The main features of a Freon Rig design for performing heat transfer experiments for PWR and BWR fuel bundles, are presented. The project is based on a Freon Rig pressurized at 30 bar with a flow rate up to 80 m^3/h. The maximum power fed to test sections is of about 420 KW D.C. The rig was designed to use scaling techniques which would enable a fluid of low latent heat to be used in place of water, thereby reducing the cost of tests.

33671 (INIS-mf—7498, pp vp) **Thermal reactor analysis for PWR fuel assemblies containing control rods.** Aminpour, M. (Israel Electric Corp. Ltd., Haifa); Rothenstein, W. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33672 (INIS-mf—7498, pp vp) **Proposed fuel management scheme for once-through PWR with 20% enrichment.** Krumbein, A.D. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center); Radkowsky, A. (Tel Aviv Univ. (Israel)); Ben-Gurion Univ. of the Negev, Beersheba (Israel)); Temkin, A. Ya. (Tel Aviv Univ. (Israel)). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33673 (INIS-mf—7498, pp vp) **Effect of asymmetric phenomena on core burn-up and power distribution.** Saphier, D. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33674 (INIS-mf—7498, pp vp) **Drift-flux model flow-regime map of two-phase flows for COTHA.** Kaizerman, S.; Wacholder, E.; Elias, E. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33675 (INIS-mf—7501, pp vp) **Water regime of secondary circuit of WWER nuclear power plant.** Toman, J. (Vyzkumny Ustav Energeticky, Prague (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

The problems are discussed of the water regime in the secondary circuit of WWER type power plants, mainly the corrosion of steam generator secondaries and the corrosion by erosion of turbines, steam separators and high-pressure heaters. Various designs of steam generators are briefly discussed, especially with respect to the corrosion of horizontal steam generators. The feasibility is discussed of affecting the salt concentration in steam generator water, as is the significance of reducing the corrosion products concentration in feedwater. The erosive corrosion of the turbine, steam separators and high-pressure heaters is mostly affected by the concentration of corrosion products in the steam and the condensate and by the oxygen water regime. The importance of 100% condensate treatment is stressed. (B.S.).

33676 (INIS-mf—7501, pp vp) **Purification of primary circuit coolant of light water reactor with Wofatit RH cation exchanger.** Jindrich, K. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

Capture was studied experimentally of selected fission products (Cs, Ba, Ce), corrosion products (Fe, Mn, Co, Cr) and sodium on cation exchanger Wofatit RH in two different ion forms (H^+ and K^+-NH_4^+) from a solution whose composition corresponded to that of the primary circuit coolant of a light water reactor. The measured values showed that strongly acidic cation exchanger Wofatit RH is suitable for the sorption of the cations studied. The H^+ form is disadvantageous in that it easily captures potassium, which disturbs the water chemistry. Thus, the mixed K^+-NH_4^+ form of the cation exchanger is more suitable for continuous coolant purification. (Ha).

33677 (INIS-mf—7501, pp vp) **Application of electromagnetic filter in water treatment in pressurized water reactor power plant.** Rypar, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

Electromagnetic filters permit water treatment of the primary circuit without reducing the pressure and temperature of the coolant. The filters are most efficient during reactor power changes and reactor shutdown when corrosion products turbulence and circulation take place. The filters are washed using the method of hot turbulent clarification by direct expansion of the hot medium into the condensation system. The development is described of a pressure electromagnetic filter for WWER nuclear power plants. (H.S.).

33678 (INIS-mf—7501, pp vp) **Cost-benefit analysis of application of H_3BO_3 thermal regeneration in WWER type reactors.** Srbek, J.; Talla, V.; Petr, J. (Energoprojekt, Prague (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

Two suggestions are given of the design of a station for boric acid concentration control in nuclear power plants (2x1000 MW). Control can be achieved by coolant discharge and the addition of pure water or boron concentrate, or by connecting a loop with thermally regenerated ion exchangers. An economic comparison is made of both alternatives with operating and capital cost related to one year of operation. (H.S.).

33679 (INIS-mf—7501, pp vp) **Automatic analyzers for monitoring water composition and their applications in nuclear power engineering.** Faehnrich, V. (Vyzkumny Ustav Upravy Vody pri n.p. CKD Dukla, Prague (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

A review is given of analyzers for chemical analysis of water in the primary circuit, of feed water in the primary circuit, monitoring of the demineralization station operation, and analysing water of the secondary circuit of WWER type nuclear power plants. The applications of the analyzers are shown. A brief description is given of some analyzers developed by CKD Dukla, such as analyzers for water turbidity, of pneumatically controlled photometric analyzers, and meters of oxygen traces. (J.B.).

33680 (NUREG/CR—3230) **Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment.** Cullen, W.H.; Torronen, K.; Kemppainen, M. (Materials Engineering Associates, Inc., Lanham, MD (USA); Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Apr 1983. 36p. (MEA—2013). NTIS, PC A03/MF A01 - GPO $4.50. Order Number DE83902017.

Portions are illegible in microfiche products.

Fatigue crack growth rates were determined for A 508-2 steel in pressurized high-temperature, reactor-grade water, over a temperature range of 93°C to 288°C (200°F to 550°F). In addition, studies of the oxide layer on the fatigue fracture surface and of the fractography of these specimens were completed in order to provide information on corrosion-assisted, fatigue crack growth mechanisms. The crack growth data show a distinct minimum in growth rate at ~ 200°C (~ 400°F). Magnetite (Fe_3O_4) was found on the fatigue fracture surfaces at all temperatures. The fractography shows brittle-like features for all test temperatures. These observations suggest that hydrogen evolution may have occurred and that hydrogen-assisted crack growth may be responsible for the environmental effects observed.

33681 (CE-TR—7892) **Underclad cracking in PWR reactor vessels.** Frederick, G.; Hernalsteen, P. (Central Electricity Generating Board, London (UK)). [nd]. A; AIM Int. Meeting: Modern Electric Power Stations, Liege, Belgium, 1981, Paper 20. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83901739.

Portions are illegible in microfiche products.

The article describes the kind of cracking which can occur under the stainless steel cladding during the manufacturing process of PWR vessels: cold cracking recently found in France on vessel nozzles; and reheat cracking discovered some ten years ago in particular in Germany and in USA. Methods of examination for underclad cracking are put forward, together with results obtained on vessel nozzles of units currently being built in Belgium. Some nozzles are affected by the phenomenon of reheat cracking, while the

hypothesis of cold cracking, which had been proposed because of the similar situation found in France, should probably be abandoned. On the basis of the investigations and studies made, it is established that the cracking involved does not jeopardize the integrity of the vessels during their lifetime.

2103 Power Reactors, Non-breeding, Graphite Moderated

REFER ALSO TO CITATION(S) 33706, 33707, 33708, 33747, 33758, 33759, 33760, 34218, 34469, 34836

33682 **(GA-A—16918) Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis.** Kozina, M.M. (GA Technologies, Inc., San Diego, CA (USA)). Mar 1983. Contract AT03-76SF70046. 8p. (CONF-830607—7). NTIS, PC A02/MF A01. Order Number DE83010187.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

This report summarizes a set of simplified structural design equations and parameters for the treatment of in-plane temperature gradients in preliminary design of high-temperature helical-coil tube-bundle support plates. The equations apply only to cases where slope changes occur during linear temperature gradients along the plate height. In addition, they are applicable only for plates whose aspect ratio W/L is between 1.5 and 7.0. It is intended that these equations be included in the overall structural feasibility investigations and calculations for determining a heat-exchanger size or envelope. The goal is to facilitate helical bundle heat-exchanger stress calculations during preliminary design phases. In addition, the simplified method of thermal-stress analysis has been substantiated by extensive finite-element calculations.

33683 (INIS-mf—7498, pp vp) **Dynamic modeling of an HTGR pebble bed reactor.** Saphier, D.; Rodnizky, Y. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33684 (INIS-mf—7498, pp vp) **Simplified moving boundaries HTGR steam generator model for the DSNP simulation language.** Sharon, A. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering); Saphier, D. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33685 **(Juel—1752) Graphitic matrix materials for spherical HTR fuel elements.** Rind, W.; Schulze, R.E.; Schulze, H.A. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen). Dec 1981. 118p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750102.

The present report comprises the essential results of material development and irradiation testing of graphitic matrix materials for spherical HTR fuel elements and completes the documentation of the irradiation data for 20 matrix materials (Juel-1702). The main emphasis is given to the matrices A3-3 (standard matrix) and A3-27 (matrix synthesized resin), both of which are being used as structural materials for the fuel elements of the AVR and the THTR respectively. In addition, comparisons are made between 18 A3-variants and the standard matrix A3-3. It is shown that three of the variants come into question as a potential for use. The results described were obtained in the framework of the HTR project 'Hochtemperaturreaktor-Brennstoffkreislauf' (HBK), in which are involved the Gesellschaft fuer Hochtemperaturreaktor-Technik mbH, Hochtemperaturreaktor-Brennelemente GmbH, Hochtemperatur-Reaktorbau GmbH, Kernforschungsanlage Juelich GmbH, NUKEM GmbH, and Sigri Elektrographit GmbH/Ringsdorff-Werke GmbH. The project is sponsored by the 'Bundesministerium fuer Forschung und Technologie' and by the state of 'Nordrhein-Westfalen'.

33686 **(Juel—1785) Construction of helium-heated steam reformers for high-temperature-reactors.** Schmitz, P. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung). May 1982. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750074.

Thesis. Submitted to Technische Hochschule Aachen, Germany, F.R.

The construction of the He-heated steam generators for HTR is investigated concerning layout-technological, stress, and quality insuring point of views. Built and designed steam generators are analysed related to the actual requirements. Stability considerations of a perforated plate of a heat-exchanger are carried out under inclusion of the thermodynamical connection to the liner. Suggestions for experiments are discussed. Based upon a thermodynamical layout for the projects Nuclear Process Heat and Prototype Nuclear Coal Gasification steam generator concepts are presented. Fundamental investigations for the technology of inservice inspections are carried out. Especially for helical coil steam generator tubes the problems of inspection are shown.

2104 Power Reactors, Non-breeding, Otherwise Moderated Or Unmoderated

REFER ALSO TO CITATION(S) 33986, 33987

33687 **(BMFT-FB-K—82-005) Irradiation behaviour of UO_2/PuO_2 mixed oxide fuel in the experiments IFA 427 and IFA 428 in the Halden boiling water reactor.** Dewes, P.; Gaertner, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 56p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750100.

Densification of UO_2/PuO_2 mixed oxide fuel as well as the heat transfer across the fuel-to-clad gap were studied in comparison with UO_2 fuel by irradiation of nine instrumented test fuel rods in two HBWR fuel assemblies. These inpile measurements were supplemented by post-irradiation examinations in Hot Cells. Under irradiation the UO_2/PuO_2 mixed oxide fuel was quite similar to the UO_2 standard fuel with respect to the dimensional and temperature behaviour. A pronounced influence of the as-fabricated pellet-to-clad gap on fuel temperature was observed.

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 33189, 33190, 33699, 33701, 33740, 33741, 33759, 33776, 34471

33688 **(CONF-830518—3) Data acquisition and control for LMFBR component testing.** Turner, G.E. (Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center). 1983. Contract AC03-76SF00700. 5p. NTIS, PC A02/MF A01. Order Number DE83011591.

From 29. international symposium of the Instrument Society of America; Albuquerque, NM, USA (2 May 1983).

Liquid Metal Fast Breeder Reactor components such as pumps, steam generators, and piping components are tested for their ability to withstand expected thermal transients of up to 25°F/s (14°C/s). The Energy Technology Engineering Center performs these tests in facilities specifically designed for that purpose. Although much of the instrumentation and controls for these test facilities are similar to those used in conventional process plants, the requirement to produce, control, and measure the effects of rapid thermal transients results in some not-so-conventional data acquisition and control system design criteria. This paper describes a typical data-acquisition system used at one of the ETEC test facilities and how the thermal transients are produced and controlled in the pump and steam-generator test facilities.

33689 **(LA-UR—83-1248) Status of steady-state irradiation testing of mixed-carbide fuel designs.** Harry, G.R. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 6p. (CONF-830545—1). NTIS, PC A02/MF A01. Order Number DE83011183.

From Core systems working group information meeting; Richland, WA, USA (10 May 1983).

The steady-state irradiation program of mixed-carbide fuels has demonstrated clearly the ability of carbide fuel pins to attain peak burnup greater than 12 at.% and peak fluences of 1.4×10^{23} n/cm^2 (E > 0.1 MeV). Helium-bonded fuel pins in 316SS cladding have achieved peak burnups of 20.7 at.% (192 MWd/kg), and no breaches have occurred in pins of this design. Sodium-bonded fuel pins in 316SS cladding have achieved peak burnups of 15.8 at.% (146 MWd/kg). Breaches have occurred in helium-bonded fuel pins in PE-16 cladding (~ 5 at.% burnup) and in D21 cladding (~ 4 at.% burnup). Sodium-bonded fuel pins achieved burnups over 11 at.% in PE-16 cladding and over 6 at.% in D9 and D21 cladding.

33690 **Gamma-ray heating in the Fast Breeder Blanket Facility.** Koch, K.R.; Clikeman, F.M.; Johnson, R.H. (Purdue Univ., West Lafayette, IN). *NBS Special Publication (United States);* No. 594, 576-580(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Gamma-ray heating rates in both stainless steel and lead have been measured in the Fast Breeder Blanket Facility using CaF_2:Dy thermoluminescent dosimeters. The TLD responses in stainless steel or lead holders were corrected by applying spectral-weighted f-factors. Corrections for neutron responses were based on CaF_2 TLD neutron sensitivities. Radial experimental heating rates are presented and have been compared to results of a radial calculation performed as three seperate steps: a neutron diffusion calculation, a distributed gamma-production calculation and a gamma-ray transport calculation. The calculation underestimates the gamma-ray heating by 20% and 42% in stainless steel and by 1% and 32% in lead at the smallest and largest blanket radii respectively. The use of the multigroup method in blanket calculations seems to cause underestimations of several nuclear parameters in the outer blanket of the Fast Breeder Blanket Facility.

33691 **Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL).** Kikuchi, Y. (Japan Atomic Energy Research Inst., Tokai, Ibaraki); Hasegawa, A.; Hojuyama, T.; Sasaki, M.; Seki, Y.; Kamei, T.; Otake, I. *NBS Special Publication (United States);* No. 594, 581-585(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Various benchmark tests were performed on JENDL-1. JENDL-1 predicted various neutronic characteristics of fast reactors fairly well. It was pointed out, however, that JENDL-1 underestimated the fission rate ratio of ^{239}Pu to ^{235}U and might give some errors in predicting the reaction rate distribution in outer core and blanket region. The effects of cross sections of structural materials were investigated concerning the latter problems.

2106 Power Reactors, Auxiliary, Mobile, Package, And Transportable

33692 **(LA-UR—83-1168) Development and test of a space-reactor-core heat pipe.** Merrigan, M.A.; Runyan, J.E.; Martinez, H.E.; Keddy, E.S. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 10p. (CONF-830629—1). NTIS, PC A02/MF A01. Order Number DE83011143.

From 18. AIAA thermophysics conference; Montreal, Canada (1 Jun 1983).

Portions are illegible in microfiche products.

A heat pipe designed to meet the heat transfer requirements of a 100-kW/sub e/ space nuclear power system has been developed and tested. General design requirements for the device included an operating temperature of 1500°K with an evaporator radial flux density of 100 w/cm^2. The total heat-pipe length of 2 m comprised an evaporator length of 0.3 m, a 1.2-m adiabatic section, and a condenser length of 0.5 m. A four-artery design employing screen arteries and distribution wicks was used with lithium serving as the working fluid. Molybdenum alloys were used for the screen materials and tube shell. Hafnium and zirconium gettering materials were used in connection with a pre-purified distilled lithium charge to ensure internal chemical compatibility. After initial performance verification, the 14.1-mm i.d. heat pipe was operated at 15 kW throughput at 1500°K for 100 hours. No performance degradation was observed during the test.

33693 **(UCRL-Trans—11841) Nuclear energy in space.** Loeb, H. Translation of *Atomkernenergie/Kerntechnik ;* **40**: No. 1, 23-30(1982). Contract W-7405-ENG-48. 28p. NTIS, PC A03/MF A01. Order Number DE83011128.

For two decades the USA and the USSR utilized radio isotope batteries and smaller nuclear reactors as power for space probes, lunar and planetary monitoring stations, as well as for monitoring- and observation satellites. The application should be expanded appreciably if future large space stations and spaceships require high power, compact, and solar-independent energy- and propulsion sources.

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 33753, 33755, 34464, 34469

33694 **(INIS-mf—7492) Hearing. Expectations and communication. Two selected examples are given.** Eisenhardt, G. (Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.)). Oct 1980. 68p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780410.

The results of the hearings concerning Wyhl and Biblis C show that the basic tendencies can also be found in the analysis of the formal licensing procedure within the ATVfV - Atomrechtliche Verfahrensordnung (an order of the Atomic Energy Law concerning the licensing procedure). The corresponding explanations are formulated in an understandable manner; thus disputes about function and procedure of the hearing are theoretically not to be expected. In practice, however, it is obvious that disputes about the usefulness and purpose of the procedure itself continue to remain the topic of violent controversies during the hearing. (DG).

33695 **(NUREG—0580-Vol.12-No.4) Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management). May 1983. 63p. NTIS, PC A04/MF A01 - GPO. Order Number DE83901722.

This management report, Regulatory Licensing Status Summary Report, is designed to provide the necessary information for controlling the progress of review processes for central station nuclear reactor applications. Section I of this edition consists of the three summary of accomplishments, the new application forecast for OL's and CP's, and an abbreviation key. Section II represents the main body of the report and consists of the facility information. All OL's are listed first, followed by CP's, standard design reviews, other reviews, and finally, a non-power reactor summary. Each project consists of general facility data, current status for all phases of the review, and targeted and actual completion dates for all key milestones in the review.

33696 **(NUREG—0896-Suppl.1) Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Apr 1983. 30p. NTIS, PC A03/MF A01 - GPO $4.50. Order Number DE83901756.

This report supplements the Safety Evaluation Report (NUREG-0896, March 1983) for the application filed by the Public Service Company of New Hampshire, et. al., for licenses to operate Seabrook Station, Units 1 and 2 (Docket Nos. STN 50-443 and STN 50-444). It has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission and provides recent information on open items identified in the SER. The

facility is located in Seabrook, New Hampshire. Subject to favorable resolution of the items discussed in this report, the staff concludes that the facility can be operated by the applicant without endangering the health and safety of the public.

33697 **(NUREG—0936-Vol.2-No.1) NRC Regulatory Agenda. Quarterly report, January-February 1983. Vol. 2, No. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Rules and Records). Apr 1983. 191p. NTIS, PC A09/MF A01 - GPO. Order Number DE83901737.

The Regulatory Agenda is a quarterly compilation of all rules on which the NRC has proposed, or is considering action as well as those on which it has recently completed action, and all petitions for rulemaking which have been received and are pending disposition by the Commission. The agenda consists of two sections. Section I, Rules includes: (1) rules on which final action has been taken since December 31, 1982, the cutoff date of the last Regulatory Agenda, (2) rules published previously as proposed rules and on which the Commission has not taken final action, (3) rules published as advance notices of proposed rulemaking and for which neither a proposed nor final rule has been issued, and (4) unpublished rules on which the NRC expects to take action. Section II, Petitions for Rulemaking includes: (1) petitions incorporated into final rules or petitions denied since December 31, 1982, (2) petitions incorporated into proposed rules, (3) petitions pending staff review, and (4) petitions with deferred action.

33698 **(NUREG—0954-Suppl.1) Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Apr 1983. 55p. NTIS, PC A04/MF A01 - GPO $4.75. Order Number DE83901757.

This reort supplements the Safety Evaluation Report (NUREG-0954) issued in February 1983 by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission with respect to the application filed by Duke Power Company, North Carolina Municipal Power Agency Number 1, North Carolina Membership Corporation, and Saluda River Electric Cooperative, Inc. as applicants and owners, for licenses to operate the Catawba Nuclear Station, Units 1 and 2 (Docket Nos. 50-413 and 50-414, respectively). The facility is located in York County, South Carolina, approximately 9.6 km (6 mi) north of Rock Hill and adjacent to Lake Wylie. This supplement provides more recent information regarding resolution or updating of some of the open and confirmatory items and license conditions identified in the Safety Evaluation Report, and discusses the recommendations of the Advisory Committee on Reactor Safeguards in its report dated March 15, 1983.

33699 **(NUREG—0968-Suppl.1) Safety evaluation report related to the construction of the Clinch River Breeder Reactor Plant. Docket No. 50-537. Suppl. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). May 1983. 32p. NTIS, PC A03/MF A01 - GPO $4.50. Order Number DE83901709.

Since the preparation of the Safety Evaluation Report the Advisory Committee on Reactor Safeguards considered the Clinch River construction permit license application at its 276th meeting and subsequently issued a favorable report, dated April 19, 1983 to the Commission (See Appendix I of this report). Additional documents associated with the application have been reviewed and a number of meetings have been held with the applicants. These events and documents are identified in Appendix E to this supplement. This supplement, SSER-1, to the Safety Evaluation Report, provides an evaluation of additional information received from the applicants since preparation of the SER regarding previously identified outstanding review items, and our response to the comments made by the Advisory Committee on Reactor Safeguards in its report.

33700 **Legal bases for the installation of nuclear power plants.** de Faria, N.M.; de Lima Moreira, Y.M. Rio de Janeiro, Brazil; Comissao Nacional de Energia Nuclear de Brazil (1980). 15p. (In Portuguese). (CONF-8006246—1).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The process of installation of nuclear power plants in the context of the Brazilian legal system is analysed. The structure of the political and administrative system related to the matter and the correspondent legislation are discussed. (A.L.).

2108 Economics

REFER ALSO TO CITATION(S) 33625, 33626, 33672, 34464

33701 **(ANL—83-2) User's guide for the REBUS-3 fuel cycle analysis capability.** Toppel, B.J. (Argonne National Lab., IL (USA)). Mar 1983. Contract W-31-109-ENG-38. 287p. NTIS, PC A13/MF A01. Order Number DE83011291.

REBUS-3 is a system of programs designed for the fuel-cycle analysis of fast reactors. This new capability is an extension and refinement of the REBUS-3 code system and complies with the standard code practices and interface dataset specifications of the Committee on Computer Code Coordination (CCCC). The new code is hence divorced from the earlier ARC System. In addition, the coding has been designed to enhance code exportability. Major new capabilities not available in the REBUS-2 code system include a search on burn cycle time to achieve a specified value for the multiplication constant at the end of the burn step; a general non-repetitive fuel-management capability including temporary out-of-core fuel storage, loading of fresh fuel, and subsequent retrieval and reloading of fuel; significantly expanded user input checking; expanded output edits; provision of prestored burnup chains to simplify user input; option of fixed-or free-field BCD input formats; and, choice of finite difference, nodal or spatial flux-synthesis neutronics in one-, two-, or three-dimensions.

33702 **(BMFT-FB-K—82-007) Improvement of reactor physics design methods for plutonium recycling in pressurized water reactors.** Fite, J.; Koebke, K.; Mueller, B.; Wagner, M.R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 165p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750084.

The utilization of plutonium fuel assemblies in mixed Pu/U cores of pressurized water reactors requires an extension of the computational methods of reactor analysis that allows to take into account the complex heterogeneous structure of such mixed oxid fuel assemblies as well as the strong spectral interaction with surrounding uranium assemblies. During this project transport theory methods for calculating the neutron spectrum for uniform fuel lattices and heterogeneous fuel assemblies as well as new techniques of homogenization and dehomogenization have been developed. These methods meet the requirements of accuracy and of compatibility with existing and proven methods for PWR uranium cores.

33703 **(BMFT-FB-K—82-008) Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen.** Schlosser, G.; Costescu, J.; Pohl, P.; Uyttendaele, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 186p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750083.

Plutonium-recycling was investigated for large pressurized and boiling water-reactors (including Wuergassen nuclear power station). MOX-FA's using two different pins are found optimal for PWR's; their insertion up to large parts per reload was investigated. For BWR's island type MOX-FA's were designed and their insertion investigated. It seems technically feasible to use large quantities of plutonium in commercial LWR's in a safe manner. Significant improvements in resource-utilization of natural uranium and separative work and economic advantages will result.

33704 (INIS-mf—7475-Vol.A, pp vp) **Qualification of reactor operators.** de Lima, J.M.; Soares, H.V. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A19/MF A01. (CONF-8104136—Vol.A).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

The qualification and performance of nuclear power personnel have an important influence on the availability and safety operation of these plants. This paper describes the Brazilian rules and norms established by the CNEN-Brazilian Atomic Energy Comission, as well as policy of other countries concerning training requirements and experiences of nuclear power reactor operators. Some coments are made about the im pact of the march 1979 Three Mile Island accident on upgrading the reactor training requirements in U.S.A. and its international implication. (Author).

33705 (INIS-mf—7498, pp vp) **Life cycle cost. Reliability optimization of a complex system.** Knoll, A. (Israel Atomic Energy Commission, Tel Aviv). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

2109 Process Heat Reactors

33706 **(INIS-mf—7355) HTR potentialities and their possible interaction with production of gas, heat and electricity.** Kugeler, K. (Gesamthochschule Duisburg (Germany, F.R.)). 1981. 26p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780405.

Following the development work of the THTR reactor as a demonstration plant near competition and four year operation of the AVR reactor at a temperature of 950°C, it can be confirmed that nuclear process heat for processes like steam reforming of methane or coal gasification can be produced. The processes have been tested in large experiments in the last years. Some main technical options and additional questions of the licensing procedure are discussed. Finally, some aspects essential for the HTR, especially the question of safety, are pointed out. (AF).

33707 **(INIS-mf—7484) Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal.** Baumgaertner, H. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 12 Nov 1979. 119p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780406.

Thesis.

In a nuclear process heat reactor which is only built for hydrogasification of brown coal a reactor inlet temperature of about 270°C and a reactor outlet temperature which lies only slightly above 900°C lead to the most efficient design of the reactor plant in view of technical and economic aspects. Reactor inlet- and outlet temperatures of 300°C and 950°C, as in the present power plant and power in the projected prototype plant, are not necessary for hydrogasification of brown coal. (orig./GG).

33708 **(Juel-Spez—154) Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger.** Breitbach, G. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung). Jun 1982. 30p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750101.

The HTR is qualified for supplying High Temperature Heat for Methane Steam Reforming. The Reforming Process running at temperatures in the range 800°C requires qualified alloys for the tubes installed in the Process Heat Exchangers. Under normal operation conditions the mechanical and thermal stresses of an INCOLOY 800 - tube are investigated. Stresses produced by pressure and starting operation are small. Higher stresses are produced by the stationary temperature profile through the wall. At the high temperature level in the wall creep phenomena reduce the thermal stresses. The relaxation of stresses is calculated with the general purpose Finite Element-program ASKA. An analysis of creep and fatigue damage shows that an operation time of 100.000 h is possible.

33709 **(ORNL/TM—8790) Application of an intermediate LWR for electricity production and hot-water district heating.** (United Engineers and Constructors, Inc., Philadelphia, PA (USA); Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 263p. NTIS, PC A12/MF A01. Order Number DE83012297.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective of the study is to evaluate the technical and economic feasibility of a 400 MWe Consolidated Nuclear Steam System (CNSS) for supplying district heat to the Minneapolis/St. Paul area. A total of three CNSS reactor sites, located various distances from the Minneapolis-St. Paul area load center, are evaluated. The distance from the load center is determined by the credited safety features of the plant design. Each site is also evaluated for three different hot water supply/return temperatures providing a total of nine CNSS study cases. The cost of district heat delivered to the load center is determined for each case.

22 NUCLEAR REACTOR TECHNOLOGY

2201 Theory And Calculation

REFER ALSO TO CITATION(S) 34794

33710 (INIS-mf—7498, pp vp) **Leakage importance.** Yaari, A.; Wagschal, J.J. (Hebrew Univ., Jerusalem (Israel). Racah Inst. of Physics); Cacuci, D.G. (Oak Ridge National Lab., TN (USA)). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33711 (INIS-mf—7498, pp vp) **Confidence limits and statistical convergence of Monte Carlo point flux estimators with unbounded variance.** Dubi, A.; Elperin, T. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33712 (INIS-mf—7498, pp vp) **Approximate method for the calculation of transmission probabilities through hollow cylinders.** Gilai, D. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33713 (INIS-mf—7498, pp vp) **Validation of the three-dimensional code TRITON.** Caspo, N.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33714 (INIS-mf—7498, pp vp) **Iterative methods in diffusion calculations.** Bartal, Y.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33715 (INIS-mf—7498, pp vp) **Assembly homogenization in TDB.** Bartal, Y.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33716 (INIS-mf—7498, pp vp) **Comparison calculations with various versions of the LEOPARD codes.** Bartal, Y.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33717 (INIS-mf—7498, pp vp) **Thermal reactor analysis for cluster geometries.** Aminpour, M. (Israel Electric Corp. Ltd., Haifa); Rothenstein, W. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33718 (INIS-mf—7498, pp vp) **JULIAN II. A code for multiple-chance fission and multi-step particle and gamma ray emission in compound nuclear reactions.** Eyal, Y. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33719 (INIS-mf—7498, pp vp) **Tight-lattice resonance absorption by cylinderization of extended cells.** Segev, M. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33720 (INIS-mf—7498, pp vp) **Sensitivity of computed integral parameters to the neutron width of the lowest U-238 resonance.** Gur, Y.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33721 (INIS-mf—7498, pp vp) **Note on correlated sampling in Monte Carlo.** Goldstein, M. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33722 (INIS-mf—7498, pp vp) **Note on correlated sampling in Monte Carlo.** Goldstein, M. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33723 (INIS-mf—7498, pp vp) **Validation of the three-dimensional code TRITON.** Caspo, N.; Yiftah, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

2202 Components And Accessories

REFER ALSO TO CITATION(S) 34465

33724 (CONF-830607—3) **Measurement of crossflow forces on tubes.** Mulcahy, T.M. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 28p. NTIS, PC A03/MF A01. Order Number DE83008523.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Portions are illegible in microfiche products.

A force transducer for measuring lift and drag coefficients for a circular cylinder in turbulent water flow is presented. In addition to describing the actual design, requirements for obtaining valid fluid-force test data are discussed, and pertinent flow-test experience is related.

33725 (INIS-mf—7501, pp vp) **Development of electromagnetic filter for removing suspended material from water circuit.** Fric, Z.; Kriz, A. 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

The filter body consists of two parallel, vertically oriented chambers made from tubes 45 mm in diameter, 5 mm thick and 1000 mm long, filled with 6.3 mm spheres. The filter is fitted with a set of four high-pressure bellows-type stainless steel valves. The filter solenoid consists of a winding, directly on the vertical tubes. A thyristor controller was used for variable filter power control by magnetic field intensity. The described equipment was designed and built for experimental purposes on the WWR-S reactor experimental channel for operating parameters: flow rate 3 t/h, filtrate temperature max. 350 degC, max. pressure 20 MPa. (J.P.).

33726 (LA-UR—83-148) **Slideline verification for multilayer pressure vessel and piping analysis.** Van Gulick, L.A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 26p. (CONF-830607—1). NTIS, PC A03/MF A01. Order Number DE83006056.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Nonlinear finite element method (FEM) computer codes with slideline algorithm implementations should be useful for the analysis of prestressed multilayer pressure vessels and piping. This paper presents closed form solutions useful for validating slideline implementations for this purpose. The solutions describe stresses and displacements of an internally pressurized elastic-plastic sphere initially separated from an elastic outer sphere by a uniform gap. Comparison of closed form and FEM results evaluates the usefulness of the closed form solution and the validity of the slideline implementation used.

2203 Fuel Elements

33727 (BMFT-FB-K—82-001) **Power ramp experiments with mixed oxide (UO_2/PuO_2) fuel rods.** Manzel, R.; Schlemmer, F.; Sontheimer, F.; Vogl, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 93p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750059.

The following irradiation experiments were performed to determine the operational behaviour of mixed oxide fuel rods during power ramps: 1. power ramp experiments in the nuclear power plant of Obrigheim (KWO) with 14 test fuel rods. 2. Power ramp experiments at HFR Petten with 10 test fuel rods, pre-irradiated in KWO. The ramp rates were about 100 W/cm min. The test fuel rods showed no defects.

33728 (INIS-mf—7498, pp vp) **Transverse cracks in irradiated metal fuel element.** Munitz, A.; Livne, Z. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33729 (INIS-mf—7498, pp vp) **Examination system of irradiated metallic fuel elements.** Livne, Z.; Munitz, A.; Regev, P.; Dagan, U.; Colter, C. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

2204 Control Systems

33730 (NUREG/CR—3217) **Near-term improvements for nuclear power plant control room annunciator systems.** Rankin, W.L.; Duvernoy, E.G.; Ames, K.R.; Morgenstern, M.H.; Eckenrode, R.J. (Battelle Human Affairs Research Center, Seattle, WA (USA); Battelle Pacific Northwest Labs., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 63p. (PNL—4662; BHARC—400/83/004). NTIS, PC A04/MF A01 - GPO $5.00. Order Number DE83011857.

This report sets forth a basic design philosophy with its associated functional criteria and design principles for present-day, hard-wired annunciator systems in the control rooms of nuclear power plants. It also presents a variety of annunciator design features that are either necessary for or useful to the implementation of the design philosophy. The information contained in this report is synthesized from an extensive literature review, from inspection and analysis of control room annunciator systems in the nuclear industry and in related industries, and from discussions with a variety of individuals who are knowledgeable about annunciator systems, nuclear plant control rooms, or both. This information should help licensees and license applicants in improving their hard-wired, control room annunciator systems as outlined by NUREG-0700.

33731 **Coming in close with Minac.** Cordova, A.H.; Lapides, M.E. *EPRI (Electric Power Research Institute) Journal;* 8: No. 2, 18-19(Mar 1983).

The Electric Power Research Institute is involved in the development of a miniaturized linear accelerator that has the flexibility and power to perform nondestructive x-ray testing and diagnostic activities in operating nuclear power plants. Successful testing and field application will enable utilities to benefit from reduced plant outages and improved net power generation. The Minac is also useful for checking personnel exposure and producing better information for future testing. (DCK)

2205 Environmental Aspects

REFER ALSO TO CITATION(S) 33222

2206 Research, Test, And Experimental Reactors

33732 (INIS-mf—7498, pp vp) **Fission source matrices in standard transport calculations.** Salmi, U.; Wagschal, J.J.; Yaari, A.; Yeivin, Y. (Hebrew Univ., Jerusalem (Israel). Racah Inst. of Physics). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33733 (INIS-SU—122, pp vp) **Analysis of sensitivity to the group constant variations in biological shield calculations by the extraction-diffusion method.** Mikhaj, K. (Budapesti Mueszaki Egyetem (Hungary)). 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Nuclear constants.

Effect of errors of group constants on the calculation accuracy of activation detector readings located in different points of the biological shield of the Budapest Technical University is considered. Comparative analysis of the calculation method and the given constants accuracies is given. For this purpose sensitivity of integral functionals calculated by the diffusion - extraction method to change in group cross sections of carbon and oxygen is analyzed. Readings of indium, sulphur and gold detectors used in the test task as well as values of integral neutron flux and absorbed dose rate were taken as the functionals. A notion of Bsub(ij) sensitivity matrix, which represents a neutron flux sensitivity in the j-group to change of some cross section in the i-group, is introduced. The analysis of sensitivity matrices determined permits to conclude: the diagonal elements of the matrix exceed considerably (in absolute value) non-diagonal ones. This means that the cross section change in some group mainly affects the flux change in it. Significant sensitivity is observed in the first four-five groups (diagonal and near-diagonal elements) for oxygen. Its values approximately equal to unity point out that during the calculations of fluxes in large depths (about 1.5 m) their determination error related to inaccuracy of the constant knowledge begins to exceed the error of the diffusion-extraction method itself. Large sensitivity values are observed in all the groups for carbon. They are large especially in the first three-four groups (about 5-8). This circumstance points to the necessity of the constant accuracy consideration for carbon during the calculations of the diffusion-extraction method at a graphite thicknesses about 40 cm and more.

33734 (ORNL/TM—8716) **Bulk Shielding Facility quarterly report October, November, and December 1982.** Corbett, B.L.; Lance, E.D.; Thomas, J.R. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 16p. NTIS, PC A02/MF A01. Order Number DE83012140.

The BSR operated at an average power level of 577 kW for 9.03% of the time during October, November, and December. Water-quality control in both the reactor primary and secondary cooling systems was satisfactory. There was one unscheduled shutdown during the quarter. The reactor was shut down on October 31, 1982, for BSR pool cleanup. The paint will be removed from the fiberglass pool walls and floor. The paint has not adhered to the fiberglass and is peeling. The reactor fuel is being transferred to the OGR canal storage. The PCA was not used during this report period and remains in a secured condition.

2207 Plutonium And Isotope Production Reactors

33735 (CONF-830418—3) **Response of aluminum and its alloys to exposure in the high flux isotope reactor.** Farrell, K. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83012059.

From International conference on dimensional stability and mechanical behavior of irradiated metals and alloys; Brighton, UK (11 Apr 1983).

Pure aluminum and some aluminum alloys were irradiated to very high neutron fluences in the cooling water at 328 K in the high flux region of HFIR. Displacement levels of 270 dpa and transmutation-produced silicon levels of 7.15 wt % were reached. Damage microstructures consisted of dislocations, cavities, and precipitates which caused substantial strengthening and associated loss in ductility. Formation of cavities and related swelling were considerably reduced by alloying elements and by the presence of fine Mg_2Si precipitate.

33736 (DP-MS—82-109) **Reactivity monitoring during reactor-reloading operations.** Baumann, N.P.; Ahlfeld, C.F.; Ridgely, G.C. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 7p. (CONF-830609—12). NTIS, PC A02/MF A01. Order Number DE83011224.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

At the Savannah River Plant (SRP) reloading operations during shutdown present special considerations in reactivity monitoring and control. Large reactivity changes may occur during reloading operations because of the heterogeneous nature of some core designs. This paper describes an improved monitoring system.

33737 (DPSP—82-30-14) Nuclear instrumentation maintenance: Savannah River reactors. Long, J.T. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1982. Contract AC09-76SR00001. 7p. (CONF-821186—1). NTIS, PC A02/MF A01. Order Number DE83011243.

From Institute of Nuclear Power Operations workshop on instrument and control; Atlanta, GA, USA (1 Nov 1982).

Savannah River reactors are heavy-water-moderated nuclear reactors which produce special nuclear materials for industrial, medical, space, and military applications. They do not have electrical-power-generation capabilities. Works Engineering has the responsibility of maintaining all electrical, instrument, and control systems. DPSOLs (du Pont Standard Operating Logsheets) are used to provide basic instructions for maintaining these systems. The frequency at which these DPSOLs are run is determined by Production DPSOLs and the Maintenance Information And Control (MIAC) system. This system is a computer-based scheduling system which issues work orders for the maintenance of equipment on a specific frequency. The system also provides historical repair data on equipment for cost-analysis purposes.

2208 Propulsion Reactors

REFER ALSO TO CITATION(S) 33693

2209 Reactor Safety

REFER ALSO TO CITATION(S) 33696, 33698, 33699, 33819, 34470

33738 (CONF-830439—5) Hydrodynamics of adiabatic inverted annular flow: an experimental study. De Jarlais, G.; Ishii, M. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 15p. NTIS, PC A02/MF A01. Order Number DE83011748.

From 3. multi-phase flow and heat transfer symposium; Miami, FL, USA (18 Apr 1983).

For low-quality film boiling in tubes or rod bundles, the flow pattern may consist of a liquid jet-like core surrounded by a vapor annulus, i.e., inverted annular flow. The stability, shape, and break-up mechanisms of this liquid core must be understood in order to model correctly this regime and to develop appropriate interfacial transfer correlations. This paper reports on a study in which inverted annular flow was simulated in an adiabatic system. Turbulent water jets, issuing downward from long-aspect nozzles were enclosed within cocurrent gas annuli. Jet-core diameter and velocity, and gas-annulus diameter, velocity, and species were varied, yielding liquid Reynolds numbers up to 33,000, void fractions from 0.29 to 0.95, and relative velocities from near zero to over 80 m/s. Jet-core break-up lengths and secondarily, core break-up mechanisms, were observed visually, using strobe lighting.

33739 (CONF-830462—1) Forecasting consequences of accidental release: how reliable are current assessment models. Rohwer, P.S.; Hoffman, F.O.; Miller, C.W. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 25p. NTIS, PC A02/MF A01. Order Number DE83011396.

From Seminar on the dynamics of the transfer to man of radioactive materials deposited subsequent to an accidental release to atmosphere; Dublin, Ireland (11 Apr 1983).

Portions are illegible in microfiche products.

This paper focuses on uncertainties in model output used to assess accidents. We begin by reviewing the historical development of assessment models and the associated interest in uncertainties as these evolutionary processes occurred in the United States. This is followed by a description of the sources of uncertainties in assessment calculations. Types of models appropriate for assessment of accidents are identified. A summary of results from our analysis of uncertainty is provided in results obtained with current methodology for assessing routine and accidental radionuclide releases to the environment. We conclude with discussion of preferred procedures and suggested future directions to improve the state-of-the-art of radiological assessments.

33740 (CONF-830607—4) Theory and application of a three-dimensional code SHAPS to complex piping systems. Wang, C.Y. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 36p. NTIS, PC A03/MF A01. Order Number DE83009682.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

This paper describes the theory and application of a three-dimensional computer code SHAPS to the complex piping systems. The code utilizes a two-dimensional implicit Eulerian method for the hydrodynamic analysis together with a three-dimensional elastic-plastic finite-element program for the structural calculation. A three-dimensional pipe element with eight degrees of freedom is employed to account for the hoop, flexural, axial, and the torsional mode of the piping system. In the SHAPS analysis the hydrodynamic equations are modified to include the global piping motion. Coupling between fluid and structure is achieved by enforcing the free-slip boundary conditions. Also, the response of the piping network generated by the seismic excitation can be included. A thermal transient capability is also provided in SHAPS. To illustrate the methodology, many sample problems dealing with the hydrodynamic, structural, and thermal analyses of reactor-piping systems are given. Validation of the SHAPS code with experimental data is also presented.

33741 (CONF-830607—5) Seismic response of large suspended tanks. Ma, D.C.; Gvildys, J.; Chang, Y.W. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 29p. NTIS, PC A03/MF A01. Order Number DE83010754.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Portions are illegible in microfiche products.

The response of the large-diametered liquid-filled tank under seismic disturbances is studied in this paper with the emphasis on the effects of the bottom-plate vibration on fluid dynamic pressure and free-surface sloshing. The fluid in the tank is treated as a continuum medium, which is quite different from the conventional method that treats the fluid as an added mass attached on the tank wall. As a result, important effects such as free-surface sloshing, fluid-structure interaction, flexibility of tank are included in the analysis.

33742 (DOE/NE/34096—1) Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982. Baratta, A.J.; Robinson, G.E.; Kim, D.; Brownson, D.A.; Morales, J.B.; Huegel, D.; Gul, M.; Macario, F. (Pennsylvania State Univ., University Park (USA)). Apr 1983. Contract AC02-82NE34096. 56p. NTIS, PC A04/MF A01. Order Number DE83011761.

Portions are illegible in microfiche products.

Since the Three Mile Island Accident of March 1979, various approaches have been undertaken to reduce the probability of such occurrences. In general, these involve the addition of more complex and sophisticated engineered safety systems and instrumentation and control systems. Such improvements will undoubtedly improve overall plant safety. This project explores an alternative approach - the optimization of the transient behavior of the reactor and associated systems. Specifically, the ability of B and W and Westinghouse reactor to withstand a turbine trip was investigated. The project examined whether the plant's transient behavior with respect to peak reactor coolant system (RCS) behavior could be optimized. Several key parameters including pressurizer size, surge line impedence, time to SCRAM, and fuel and moderator temperature coefficients were varied. It was found that increasing pressurizer size decreased peak RCS pressure.

33743 (EPRI-NP—2966) Examination of mechanical snubbers from TMI-2. Final report. Wadsworth, F.L.; Walker, R.S.; Kurdziel, E.P. (International Energy Associates Ltd., Washington, DC (USA)). Mar 1983. 116p. NTIS, PC A06/MF A01. Order Number DE83901978.

Portions are illegible in microfiche products.

This report documents the status of the mechanical snubber examination project sponsored by the Electric Power Research

Institute's Three Mile Island Unit 2 Mechanical Component Information and Examination Program (MCI & EP). Five mechanical snubbers manufactured by Pacific Scientific Company (PSA) were the first components removed from containment for examination under the MCI & EP. They were transported to Wyle Laboratories for inspection and for functional and dynamic testing. The PSA-1 snubber removed from the core flood line was found to be undamaged and passed all tests. However, the four PSA-1/4 snubbers removed from the decay heat removal (auxiliary spray) line were inoperative and had severely damaged internals.

33744 **(GEND-INF—019-Vol.2) Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II.** Voilleque, P.G.; Noyce, J.R.; Pelletier, C.A. (Science Applications, Inc., Idaho Falls, ID (USA); Science Applications, Inc., Rockville, MD (USA)). May 1983. Contract AC07-76ID01570. 60p. NTIS, PC A04/MF A01. Order Number DE83011877.

The selection of methods for removal of the plenum and fuel from the Three Mile Island Unit 2 (TMI-2) reactor vessel will necessarily consider the quantities of radioactivity in solution and associated with suspended particulates in the reactor coolant. The total amount of suspended solids, which affects water clarity and equipment wear, must also be considered in the selection of the defueling technique and the subsystems needed to maintain acceptable operating conditions. Currently available data from TMI-2 and laboratory studies of relevant parameters were reviewed and used to develop estimates of source terms for total suspended particulates, particulate radionuclides, and soluble radionuclides during TMI-2 defueling operations. Potential control techniques for particulates and soluble species were reviewed and their design capabilities were estimated. Additional measurements that could reduce the uncertainty bounds for the estimates are recommended.

33745 (INIS-mf—7475-Vol.A, pp vp) **Analysis of the metallic containment integrity of Angra I.** Costa, J.R. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A19/MF A01. (CONF-8104136—Vol.A).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

The main goal of this work is to evaluate the long-term pressure and temperature behavior inside the metallic containment of a PWR building subjected to a postulated loss-of-coolant accident. The computer program used was CONDRU 4. Calculations were made for Angra I plant assuming the ocurrence of the worst accident to the containment integrity. The results obtained from CONDRU were compared with those from CONTEMPT-LT and COCO, which are codes similar to CONDRU.

33746 (INIS-mf—7475-Vol.C, pp vp) **Nuclear class 1 piping stress analysis.** Lucas, J.C.R.; Maneschy, J.E.; Mariano, L.A.; Tamura, M. (FURNAS, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.C).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

A nuclear class 1 piping stress analysis, according to the ASME code, is presented. The TRHEAT computer code has been used to determine the piping wall thermal gradient. The NUPIPE computer code was employed for the piping stress analysis. Computer results were compared with the allowable criteria from the ASME code..

33747 **(Juel—1782) REACT/THERMIX - a computer code to calculate graphite corrosion due to accidents in pebble-bed reactors.** Moormann, R.; Petersen, K. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung). Apr 1982. 48p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750075.

his report presents the description of the computer code REACT/THERMIX, which was developed for calculations of the graphite corrosion phenomena and accident transients in gas cooled High Temperature Reactors (HTR) under air and/or water ingress accident conditions. The two-dimensional code is characterized by direct coupling of thermodynamic, fluiddynamic and chemical processes with a separate handling of heterogeneous chemical reactions.

33748 **(LA-UR—83-658) Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads.** Baker, W.E.; Bennett, J.G.; Babcock, C.D. (Los Alamos National Lab., NM (USA); New Mexico Univ., Albuquerque (USA); California Inst. of Tech., Pasadena (USA)). 1983. Contract W-7405-ENG-36. 14p. (CONF-830607—9). NTIS MF A01. Order Number DE83010162.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Microfiche only, copy does not permit paper copy reproduction.

Six steel shells having nuclear containment-like features were fabricated and loaded to failure with an offset axial load. The shells of $R/t = 500$ buckled plastically. Four of the shells had reinforced circular cutouts. These penetrations were sized to cut no ring-stiffener, a single, two- or three-ring stiffeners. Reinforcing and framing around the penetrations were based upon the area-replacement rule of the applicable portion of the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code and were of a design to simulate actual practice for nuclear steel containments. Prior to testing, imperfections were measured and strain gages were applied to determine information on load distribution at the ends of the cylinder and strain fields at areas likely to buckle. Buckling loads were determined for an axial load applied with an eccentricity of R/2 where R is the cylinder radius.

33749 **(LA-UR—83-1238) Nuclear reactor safety in the USA.** Vigil, J.C. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 11p. (CONF-830547—1). NTIS, PC A02/MF A01. Order Number DE83011182.

From 7. annual symposium of the Mexican American Engineering Society; Ventura, CA, USA (3 May 1983).

Nuclear reactor safety in the USA has emphasized a defense-in-depth approach to protecting the public from reactor accidents. This approach was severely tested by the Three Mile Island accident and was found to be effective in safeguarding the public health and safety. However, the economic impact of the TMI accident was very large. Consequently, more attention is now being given to plant protection as well as public-health protection in reactor-safety studies. Sophisticated computer simulations at Los Alamos are making major contributions in this area. In terms of public risk, nuclear power plants compare favorably with other large-scale alternatives to electricity generation. Unfortunately, there is a large gulf between the real risks of nuclear power and the present public perception of these risks.

33750 **(LBL—14846-Rev.) Effects of the accident at Three Mile Island on the mental health and behavioral responses of the general population and nuclear workers.** Fabrikant, J.I. (California Univ., Berkeley (USA)). Feb 1983. Contract AC03-76SF00098. 23p. (CONF-820265—1-Rev.). NTIS, PC A02/MF A01. Order Number DE83011688.

From American Psychological Association mid-winter convention; Monterey, CA, USA (25 Feb 1982).

On March 28, 1979, an accident occurred at the Three Mile Island nuclear power plant Unit No. 2 near Middletown, PA. A Presidential Commission was established to investigate the incident and was given the responsibility to evaluate the actual and potential impact of the events on the health and safety of the workers and the public. A main conclusion of the investigation was that the most serious health effect was severe, short-lived mental stress. This paper describes the study and the findings for four different study groups: (1) the general population of heads of households located within 20 miles of the plant; (2) mothers of preschool children from the same area; (3) teenagers in the 7th, 9th, and 11th grades from the area; and (4) nuclear workers employed at the Three Mile Island nuclear power plant. (ACR)

33751 **(NUREG—0728-Rev.1) NRC Incident-Response Plan.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Inspection and Enforcement). Apr 1983. 27p. NTIS, PC A03/MF A01 - GPO $3.75. Order Number DE83901744.

The Nuclear Regulatory Commission (NRC) regulates civilian nuclear activities to protect the public health and safety and to preserve environmental quality. An Incident Response Plan had been developed and has now been revised to reflect current Commission policy. NUREG-0728, Rev. 1 assigns responsibilities for responding to any potentially threatening incident involving NRC licensed activities and for assuring that the NRC will fulfill its statutory mission. This report has also been reproduced for staff use as NRC Manual Chapter 0502.

33752 **(NUREG—0892-Suppl.No.3) Safety evaluation report related to the operation of WPPSS Nuclear Project No. 2. Docket No. 50-397 .** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). May 1983. 54p. NTIS, PC A04/MF A01 - GPO $4.75. Order Number DE83902085.

This report, Supplement No. 3 to the Safety Evaluation Report (SSER 3) for Washington Public Power Supply System's application for a license to operate WNP-2 (Docket No. 50-397), located in Benton County, Washington, approximately 12 miles north of Richland, Washington, has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission. This supplement reports the status of certain items that had not been resolved at the time of publication of the Safety Evaluation Report and Supplements No. 1 and 2.

33753 **(NUREG—0999) Sizewell B - analysis of British application of US PWR technology.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). May 1983. 93p. NTIS, PC A05/MF A01 - GPO $5.50. Order Number DE83902119.

This report provides information on the staff's evaluation of major design differences and issues developed by the British in their application (Sizewell B) of US PWR technology. One design change, the addition of steam-driven charging pumps, was assessed to have a relatively high value compared to the other changes. However, the assessment is based on a number of assumptions for which inadequate data exist to make an unqualified judgment. Other changes to the US design (as typified by the SNUPPS design) were found to have relatively low or moderate safety benefits for US application.

33754 **(NUREG—1000-Vol.1) Generic implications of ATWS events at the Salem Nuclear Power Plant: generic implications. Vol. 1.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Apr 1983. 147p. NTIS, PC A07/MF A01 - GPO $6.50. Order Number DE83901791.

Portions are illegible in microfiche products.

This report is the first of two volumes. It documents the work of an interoffice, interdisciplinary NRC Task Force established to determine the generic implications of two anticipated transients without scram (ATWS) at the Salem Nuclear Power Plant, Unit 1 on February 22 and 25, 1983. A second report will document the NRC actions to be taken based on the work of the Task Force. The Task Force was established to address three questions: (1) Is there a need for prompt action for similar equipment in other facilities. (2) Are NRC and its licensees learning the sefety-management lessons, and, (3) How should the priority and content of the ATWS rule be adjusted. A number of short-term actions were taken through Bulletins and an Information Notice. Intermediate-term actions to address the generic issues will be addressed in the separate report and implemented through appropriate regulatory mechanisms.

33755 **(NUREG/CR—2000-Vol.2-No.4) Licensee Event Report (LER) compilation for month of April 1983.** (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 111p. (ORNL/NSIC—200-Vol.2-No.4). NTIS, PC A06/MF A01; - GPO. Order Number DE83011885.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of the document. The LERs, from which this information is derived, are submitted to the Nuclear Regulatory Commission (NRC) by nuclear power plant licensees in accordance with federal regulations. Procedures for LER reporting are described in detail in NRC Regulatory Guide 1.16 and NUREG-0161, Instructions for preparation of Data Entry Sheets for Licensee Event Reports. The LER summaries in this report are arranged alphabetically by facility name and then chronologically by event date for each facility. Component, system, and keyword indexes follow the summaries.

33756 **(NUREG/CR—2568) BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results.** Schumacher, D.G.; Eckert, T.; Findlay, J.A. (General Electric Co., San Jose, CA (USA). Nuclear Engineering Div.). Apr 1983. 128p. (EPRI-NP—2374; GEAP—22046). NTIS, PC A07/MF A01 - GPO $6.00. Order Number DE83902161.

Portions are illegible in microfiche products.

Transient Loss of Coolant Accident (LOCA) experiments conducted in the Steam Sector Test Facility have addressed multidimensional system refill-reflood phenomena. Tests conducted over a pressure domain from 150 psia to ambient have investigated Emergency Core Cooling Systems (ECCS) combinations and injection location, recirculation line break area, initial system mass (i.e., at the start of ECCS injection), and ECCS liquid temperature. Specially scaled tests were also conducted for system phenomena tieback to one-dimensional LOCA simulation experiments. Test results demonstrate beneficial multidimensional effects leading to early refill and reflood. The system reflood performance is insensitive to variation in initial system mass, break area, and ECCS temperature. Variation in ECCS combinations and injection location affect the distribution of mass and energy within the system, as well as the system reflood rate.

33757 **(NUREG/CR—2650-R4) Allowable shipment frequencies for the transport of toxic gases near nuclear power plants.** Bennett, D.E.; Heath, D.C. (Sandia National Labs., Albuquerque, NM (USA)). Oct 1982. Contract AC04-76DP00789. 34p. (SAND—82-0774-R4). NTIS, PC A03/MF A01. Order Number DE83011738.

One part of the safety analysis of offsite hazards for a nuclear power plant is consideration of accidents which could release toxic gases or vapors and thus jeopardize plant safety through incapacitation of the control-room operators. The purpose of this work is to provide generic, bounding estimates of the maximum allowable shipping frequencies for the transport of a chemical near the plant, such that the regulatory criteria for the protection of the operators are met. A probabilistic methodology was developed and then applied to the truck and rail transport of an example chemical, chlorine. The current regulatory criteria are discussed in detail. For this study, a maximum allowable probability of occurrence of operator incapacitation of 10^{-6} per year was used in the example calculation for each mode of transport. Comprehensive tables of conditional probabilities are presented. Maximum allowable shipping frequencies are then derived. These frequencies could be used as part of a generic, bounding criterion for the screening of toxic hazards safety analyses.

33758 **(NUREG/CR—2716-Vol.4) Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4.** Edler, S.K. (ed.). (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 62p. (PNL—4275-4). NTIS, PC A04/MF A01 - GPO $5.00. Order Number DE83012248.

Portions are illegible in microfiche products.

Evaluations of nondestructive examination (NDE) techniques and instrumentation are reported; areas of investigation include demonstrating the feasibility of determining the strength of structural graphite, evaluating the feasibility of detecting and analyzing flaw growth in reactor pressure boundary systems, examining NDE reliability and probabilistic fracture mechanics, and assessing the integrity of pressurized-water-reactor steam-generator

tubes where service-induced degradation has been indicated. Experimental data and analytical models are being provided to aid in decision making regarding pipe-to-pipe impacts following postulated breaks in high-energy fluid system piping. Core thermal models being developed to provide better digital codes to compute the behavior of full-scale reactor systems under postulated accident conditions. Fuel assemblies and analytical support are being provided for experimental programs at other facilities.

33759 **(NUREG/CR—2814-Vol.3) Nuclear reactor safety. Progress report, July 1-October 31, 1982.** Stevenson, M.G (comp.). (Los Alamos National Lab., NM (USA)). Apr 1983. Contract W-7405-ENG-36. 27p. (LA—9649-PR). NTIS, PC A03/MF A01. Order Number DE83012412.

Portions are illegible in microfiche products.

The work that is highlighted here represents accomplishments for the period July 1-October 31, 1982, by the groups at Los Alamos involved in reactor safety research for the Division of Accident Evaluation, Office of Nuclear Regulatory Research, of the US Nuclear Regulatory Commission. Presented are brief overviews compiled by project, along with a bibliography of Technical Notes and publications written during this quater.

33760 **(NUREG/CR—2874-Vol.3) High-temperature gas-cooled-reactor safety studies for the Division of Accident Evaluation. Quarterly progress report, July 1-September 30, 1982. Volume 3.** Ball, S.J.; Clapp, N.E. Jr.; Cleveland, J.C.; Conklin, J.C.; Harrington, R.M.; Kelmers, A.D.; Lindemer, T.B.; Siman-Tov, I. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 26p. (ORNL/TM—8443/Vol.3). NTIS, PC A03/MF A01 - GPO. Order Number DE83011872.

Continuing high-temperature gas-cooled reactor safety code development efforts included work on the overall nuclear steam supply system code ORTAP, versions of the three-dimensional core code ORECA for both Fort St. Vrain and the 2240-MW(t) lead plant, the BLAST steam generator code, and a simplified core model code called SCORE. Investigations were also continued to determine the status of fission-product source-term methodology applicable to postulated severe accidents.

33761 **(NUREG/CR—3012-Vol.1) Interactive Rapid Dose Assessment Model (IRDAM): user's guide.** Poeton, R.W.; Moeller, M.P.; Laughlin, G.J.; Desrosiers, A.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 12p. (PNL—4510-Vol.1). NTIS, PC A02/MF A01 - GPO $3.25. Order Number DE83012497.

As part of the continuing emphasis on emergency preparedness the US Nuclear Regulatory Commission (NRC) sponsored the development of a rapid dose assessment system by Pacific Northwest Laboratory (PNL). This system, the Interactive Rapid Dose Assessment Model (IRDAM) is a micro-computer based program for rapidly assessing the radiological impact of accidents at nuclear power plants. This User's Guide provides instruction in the setup and operation of the equipment necessary to run IRDAM. Instructions are also given on how to load the magnetic disks and access the interactive part of the program. Two other companion volumes to this one provide additional information on IRDAM. Reactor Accident Assessment Methods (NUREG/CR-3012, Volume 2) describes the technical bases for IRDAM including methods, models and assumptions used in calculations. Scenarios for Comparing Dose Assessment Models (NUREG/CR-3012, Volume 3) provides the results of calculations made by IRDAM and other models for specific accident scenarios.

33762 **(NUREG/CR—3012-Vol.2) Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2.** Poeton, R.W.; Moeller, M.P.; Laughlin, G.J.; Desrosiers, A.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 86p. (PNL—4510-Vol.2). NTIS, PC A05/MF A01 - GPO $5.50. Order Number DE83012498.

Portions are illegible in microfiche products.

As part of the continuing emphasis on emergency preparedness, the US Nuclear Regulatory Commission (NRC) sponsored the development of a rapid dose assessment system by Pacific Northwest Laboratory (PNL). This system, the Interactive Rapid Dose Assessment Model (IRDAM) is a micro-computer based program for rapidly assessing the radiological impact of accidents at nuclear power plants. This document describes the technical bases for IRDAM including methods, models and assumptions used in calculations. IRDAM calculates whole body (5-cm depth) and infant thyroid doses at six fixed downwind distances between 500 and 20,000 meters. Radionuclides considered primarily consist of noble gases and radioiodines. In order to provide a rapid assessment capability consistent with the capacity of the Osborne-1 computer, certain simplifying approximations and assumptions are made. These are described, along with default values (assumptions used in the absence of specific input) in the text of this document. Two companion volumes to this one provide additional information on IRDAM. The user's Guide (NUREG/CR-3012, Volume 1) describes the setup and operation of equipment necessary to run IRDAM. Scenarios for Comparing Dose Assessment Models (NUREG/CR-3012, Volume 3) provides the results of calculations made by IRDAM and other models for specific accident scenarios.

33763 **(NUREG/CR—3012-Vol.3) Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3.** Poeton, R.W.; Moeller, M.P.; Laughlin, G.J.; Desrosiers, A.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 149p. (PNL—4510-Vol.3). NTIS, PC A07/MF A01 - GPO $6.50. Order Number DE83012489.

The Interactive Rapid Dose Assessment Model (IRDAM) is a micro-computer based program designed to provide rapid assessments of the radiological impact of accidents at nuclear power plants. The main body of this document consists of 28 examples of IRDAM input and output, representing various types of accidents and releases. These examples are intended to provide a basis for comparison with other models or for testing IRDAM itself. Figures are included which show dose rates calculated by IRDAM for each scenario. Figures are also included which show calculations made using the computer codes WRAITH (Scherpelz, Borst and Hoenes, 1980) and RADPUR (Dabbert, et. al., 1982). Two other companion volumes to this one provide additional information on IRDAM. The User's Guide (NUREG/CR-3012, Volume 1) describes the setup and operation of equipment necessary to run IRDAM. Reactor Accident Assessment Methods (NUREG/CR-3012, Volume 2) describes the technical bases for IRDAM including methods, models and assumptions used in calculations.

33764 **(NUREG/CR—3013) Review of the Rancho Seco Nuclear Generating Station Unit No. 1 auxiliary feedwater-system reliability analysis.** Ilberg, D.; Youngblood, R.; Papazoglou, I.A. (Brookhaven National Lab., Upton, NY (USA)). Apr 1983. Contract AC02-76CH00016. 49p. (BNL-NUREG—51620). NTIS, PC A03/MF A01 - GPO $4.75. Order Number DE83011868.

Portions are illegible in microfiche products.

This report presents the results of a review of the Auxiliary Feedwater System Upgrade Reliability Analysis for the Rancho Seco Nuclear Generating Station Unit No. 1. The objective of this report is to estimate the availability of the Auxiliary Feedwater System when required to perform its mission for each of three different initiators: (1) loss of main feedwater with offsite power available; (2) loss of offsite power; (3) loss of all 4160 VAC power. The scope, methodology, and failure data are prescribed by NUREG-0611, Appendix III. The results are compared with those obtained in NUREG-0611 for other plants.

33765 **(NUREG/CR—3155) Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface.** Sauter, A.; Cheverton, R.D.; Iskander, S.K. (Oak Ridge National Lab., TN (USA)). 11 May 1983. Contract W-7405-ENG-26. 35p. (ORNL/TM—8649). NTIS, PC A03/MF A01. Order Number DE83011604.

The computer code OCA-I calculates the temperature distribution through the walls of a cylinder during a thermal transient and then performs a two-dimensional linear-elastic fracture-mechanics analysis to obtain stress-intensity factors for long surface flaws, considering both pressure and thermal loads. The code has been

particularly useful in evaluating flaw behavior in reactor pressure vessels during overcooling accidents, but it has not previously treated the stainless steel cladding on the inner surface of the vessel as a discrete region. Although the cladding is quite thin compared with the base material, the large difference in thermal conductivity and coefficient of thermal expansion between the two materials results in a significant effect of the cladding on stress-intensity factors for surface cracks. Thus, the cladding was recently included as a discrete region in OCA-I.

33766 **(NUREG/CR—3185) Critical review of the reactor-safety study radiological health effects model. Final report.** Cooper, D.W.; Evans, J.S.; Jacob, N.; Kase, K.R.; Maletskos, C.J.; Robertson, J.B.; Smith, D.G. (Harvard Univ., Boston, MA (USA). Dept. of Environmental Health Sciences). Mar 1983. Contract AC04-76DP00789. 167p. (SAND—82-7081). NTIS, PC A08/MF A01 - GPO. Order Number DE83012294.

Portions are illegible in microfiche products.

This review of the radiological health effects models originally presented in the Reactor Safety Study (RSS) and currently used by the US Nuclear Regulatory Commission (NRC) was undertaken to assist the NRC in determining whether or not to revise the models and to aid in the revision, if undertaken. The models as presented in the RSS and as implemented in the CRAC (Calculations of Reactor Accident Consequences) Code are described and critiqued. The major elements analyzed are those concerning dosimetry, early effects, and late effects. The published comments on the models are summarized, as are the important findings since the publication of the RSS.

33767 **(NUREG/CR—3226) Station Blackout accident analyses (Part of NRC Task Action Plan A-44).** Kolaczkowski, A.M.; Payne, A.C. Jr. (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 277p. (SAND—82-2450). NTIS, PC A13/MF A01 - GPO $8.00. Order Number DE83011946.

Portions are illegible in microfiche products.

This report presents the results of the accident-sequence-analysis portion of Task Action Plan A-44 Station Blackout. Along with a companion report by ORNL on onsite AC power systems, a technical basis for the resolution of Task A-44 is provided. For this report, an extensive review of decay-heat-removal systems was conducted and generic fault-tree models of the systems analyzed were constructed. These generic models were selected on the basis of (1) the number of plants having such a system, and (2) the ease of modifying the model to allow sensitivity studies to cover all significant variations of system design. Event trees using station blackout as the initiating event were constructed to define the possible accident sequences. For the dominant sequences, sensitivity analyses are done to show the effects on both individual sequence and total core-melt frequency of changing various plant parameters. Many changes were found to be effective in reducing total core-melt frequency.

33768 **(UCID—19704) Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265.** Selan, J.C. (Lawrence Livermore National Lab., CA (USA)). 18 May 1983. Contract W-7405-ENG-48. 9p. NTIS, PC A02/MF A01. Order Number DE83011807.

This report documents the technical evaluation of the monitoring of electric power to the reactor protection system (RPS) at the Quad Cities Nuclear Power Station, Units 1 and 2. The evaluation is to determine if the proposed design modification will protect the RPS from abnormal voltage and frequency conditions which could be supplied from the power supplies and will meet certain requirements set forth by the Nuclear Regulatory Commission. The proposed design modifications will protect the RPS from sustained abnormal voltage and frequency conditions from the supplying sources.

33769 **(UCID—19705) Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249.** Selan, J.C. (Lawrence Livermore National Lab., CA (USA)). 18 May 1983. Contract W-7405-ENG-48. 9p. NTIS, PC A02/MF A01. Order Number DE83011809.

This report documents the technical evaluation of the monitoring of electric power to the reactor protection system (RPS) at the Dresden Nuclear Power Station, Units 2 and 3. The evaluation is to determine if the proposed conditions which could be supplied from the power supplies and will meet certain requirements set forth by the Nuclear Regulatory Commission. The proposed design modifications will protect the RPS from sustained abnormal voltage and frequency conditions from the supplying sources.

33770 **(UCRL—86230) Towards a systematic format for (seismic) equipment qualification standards.** Smith, P.D. (Lawrence Livermore National Lab., CA (USA)). 9 Nov 1982. Contract W-7405-ENG-48. 18p. (CONF-830607—8). NTIS, PC A02/MF A01. Order Number DE83002056.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

As part of technical assistance to the US Nuclear Regulatory Commission (NRC, 1), a systematic format for seismic equipment qualification (EQ) was initiated. This format consists of thirty issues associated with seismic EQ. Each issue was considered as a Category of Possible Seismic EQ Requirements and Criteria. That is, seismic EQ standards might be (but presently are not formulated in terms of requirements and criteria that address each of the thirty issues. Each of the thirty issues was ranked and a minimum set identified. The current requirements in existing NRC and national standards were also evaluated against this common set of issues, and they were estimated to score 60 out of 100 overall. It is believed that the systematic format exhibited in this paper can be of assistance in obtaining a broader and more complete perspective on seismic EQ issues. This format (but especially the technique) may also be of interest in non-seismic EQ since many of the issues are common.

33771 **A probabilistic analysis of LWR steam explosions.** Swenson, D.V. (Sandia National Lab., Albuquerque, NM); Corradini, M.L. pp 293-302 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Post Chester, NY, USA (20 Sep 1981).

In this paper, we present a probabilistic assessment of containment failure due to an in-vessel explosion following a core melt accident in a Light Water Reactor. We limit our assumptions to the most basic physical parameters of the core melt accident and describe these parameters with frequency distributions. A Monte Carlo solution technique is used to calculate output frequency distributions for steam explosion energy, reactor vessel response, and resulting missile velocities. Based on current results, we estimate the probability of containment failure due solely to an in-vessel steam explosion to be one to two orders of magnitude smaller than the probability calculated in the Reactor Safety Study (WASH-1400).

33772 **Implementing quantitative analysis and its complement.** Rasmuson, D.M.; Nelson, W.R.; Shepherd, J.C. (EG & G Idaho, Inc., Idaho Falls, ID). pp 324-332 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—). Contract AC07-76ID01570.

From ANS/ENS topical meeting on probabilistic risk assessment; Post Chester, NY, USA (20 Sep 1981).

This paper presents an application of risk analysis for the evaluation of nuclear reactor facility operation. Common cause failure analysis (CCFA) techniques to identify potential problem areas are discussed. Integration of CCFA and response trees, a particular form of the path sets of a success tree, to gain significant insight into the operation of the facility is also demonstrated. An example illustrating the development of the risk analysis methodology, de-

velopment of the fault trees, generation of response trees, and evaluation of the CCFA is presented to explain the technique.

33773 **Subsystem seismic response uncertainty from sources in the seismic methodology chain.** O'Connell, W.J. (Lawrence Livermore National Lab., CA). pp 390-399 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Post Chester, NY, USA (20 Sep 1981).

This study examines uncertainties in a subsystem's response to earthquakes as they arise from uncertainties in the seismic methodology chain (SMC). Computer experiments were used, modeling not only the dynamic responses to earthquakes but also the uncertainty in the responses. Models of a specific nuclear power plant were used. Subsystem uncertainties had the strongest impact on the subsystem response uncertainties. Structural uncertainties had a strong impact on some subsystems. Seimic input uncertainties (given a peak acceleration within a limited range) had a modest impact. Soil property uncertainties had little effect at this site; other soil-structure interaction uncertainties were not incorporated.

33774 **Risk assessment of filtered-vented containment options for a BWR Mark I containment.** Benjamin, A.S. (Sandia National Lab., Albuquerque, NM); Harper, F.T.; Cybulskis, P. pp 470-479 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Post Chester, NY, USA (20 Sep 1981).

We have recently performed a probabilistic risk assessment of filtered-vented containment system design concepts for a Mark I containment boiling water reactor. Our objectives were to identify the most promising accident mitigation strategies and design options from among several candidates, to identify the factors that could limit their effectiveness, to estimate the net risk reduction potential, to elucidate certain reliability objectives and performance requirements, and to help the NRC to prioritize research needs. In addition to meeting these objectives, an important accomplishment of the study was the development of a risk assessment methodology to assess accident mitigation alternatives. The results indicate that some venting strategies will achieve significant risk reductions (factors of 40 to 400) for the Mark I BWR if certain design provisions are included to circumvent potential problem areas.

33775 **Three Mile Island.** Buhl, A.R. (Technology for Energy Corporation, Knoxville, TN). *NBS Special Publication (United States);* No. 594, 916-919(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The Three Mile Island accident was the worst accident ever experienced by the nuclear power industry. Although the radiation exposures were extremely low, the potential for greater public exposure did exist. Fortunately, the health and safety of the public were not affected by radiation, nor was anyone killed or injured; however, thousand of lives were disrupted by fear and anxiety and by a limited evacuation. The events and actions contributing to the accident are described.

33776 **Fission gas effects in fast reactor disassembly.** Walker, S.P. London, England; London Univ. (1980). 213p. Thesis.

It has been suggested that the noble gas fission products may significantly reduce energy release in hypothetical fast reactor disassembly accidents, by their pressurisation of the core on fuel melting causing core expansion and neutronic shutdown at lower fuel energies. A computational model to incorporate fission gas pressures into a disassembly code is described. This model makes provision for gas and temperature variations radially within pins, and for a delay between fuel melting and effective gas pressure generation. A range of disassembly calculations is made with this model, principally considering 100 dollars/s ramp rates, and it is shown that only small reductions in energy release are likely, and that these disappear if gas release is delayed by approximately 1/2 to 1 ms after fuel melts, or if modest residual structural strength of the core is assumed. Some cases are identified in which fission gases might cause significant increases in energy release following inwards movement of parts of the core.

33777 **Aspects of the Brazilian law on civil liability for nuclear damage.** da Rocha, L.M.G. Rio de Janeiro, Brazil; NUCLEBRAS (1980). 15p. (In Portuguese). (CONF-8006246—3).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The civil liability for nuclear damage in the Brazilian law is analysed. The innovations introduced by the 6.453 act of October 17 th, 1977 are emphasized. The influence of international conventions on the Brazilian law are also mentioned. (A.L.).

33778 **Development trends of nuclear risk insurance in Brazil.** Winters, M.H.W.; da Costa, M.P.R. Rio de Janeiro, Brazil; Instituto de Resseguros do Brazil (1980). 8p. (In Portuguese). (CONF-8006246—4).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The legal guarantees of the pacific usage of nuclear energy are analysed. The principle of the operator's civil liability is emphasized. (A.L.).

25 ENERGY STORAGE

2505 Flywheels

33779 **(UCRL—89085) Composite flywheels: status and performance assessment and projections.** Coppa, A.P.; Kulkarni, S.V. (Lawrence Livermore National Lab., CA (USA); General Electric Co., Philadelphia, PA (USA). Space Systems Div.). 1983. Contract W-7405-ENG-48. 21p. (CONF-830503—2). NTIS, PC A02/MF A01. Order Number DE83012048.

From 2. European symposium on flywheel energy storage; Torino, Italy (9 May 1983).

Portions are illegible in microfiche products.

Prototype composite energy-storage flywheels that have evolved from the US Department of Energy/Lawrence Livermore National Laboratory flywheel-development program are described. The flywheels produced by Garrett AiResearch and General Electric Company have demonstrated high energy-storage performance and durability in ultimate-speed and cyclic-spin tests. Ultimate energy densities as high as 72.8 Wh/kg (702 Wh) and 114 kWh/m^3 have resulted with a design potential up to 100 Wh/kg ultimate. Low-cost rotor designs are also discussed and ultimate-speed spin-test results reported. Progress in understanding the failure modes and containment behavior of these rotors and plans to test burst containment within prototype flywheel housings are noted.

2506 Thermal

REFER ALSO TO CITATION(S) 33548, 33896

33780 **(BMFT-FB-T—83-020) Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures >=90°C.** Geipel, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 208p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83750868.

Portions are illegible in microfiche products.

This investigation was to provide an answer to the question of whether the construction of a very large pressureless hot-water displacement storage in the ground is possible in or near heavily-populated areas in the Federal Republic of Germany taking into account reasonable safety and environmental factors, and whether an economic operation using the system as a seasonal store over a whole year can be expected for water storage temperatures of at least 90°C. If the answers to these questions were positive it was planned to build a pilot plant of 30.000 m^3. Several design concepts for earth and container stores were worked out and compared. No decision was made to go ahead with the construction.

33781 **(NP—3770061) Model to calculate the temperature characteristics of heat storage basins.** Staudt, A. (Technische Univ. Muenchen (Germany, F.R.). Lehrstuhl A fuer Thermodynamik). 15 Dec 1981. 120p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770061.

Portions are illegible in microfiche products; Thesis.

A method of approximation is presented by which the temperature characteristics of warm-water heat storage basins can be calculated in consideration of all internal and external heat losses. In the model, the storage basin is divided into a central region and a boundary region along the vertical walls. The method is suitable for short-term and long-term storage systems. With its short computing time, it is suitable for optimisation and rentability calculations of projected storage systems. The parameter studies carried out have shown that efficiencies $> 70\%$ can be achieved, and that the optimum height-to-width ratio of cubic basins of quadratic cross-section is in the range $1 < H/B < 2$.

2509 Batteries

33782 **(BMFT-FB-T—83-016) Development of a stationary battery for high load with increased efficiency of load levelling.** Kiessling, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 110p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750861.

Portions are illegible in microfiche products.

After defining specifications the general design for reduction of the inner resistance and for increase of the specific capacity of the lead-acid battery compared with the nowadays standard was worked out. The design efforts were assisted by using a mathematical approach. From the results of the first model cells it could be seen, that it was necessary to develop a new alloy for the positive grid. For the design of the negative grids the results from the previous project 4142 A were used. The technology for auxiliary systems for maintenance-free service, i.e., recombination, acid circulating, electrical acid density measuring, and acid level indication systems has been worked out and samples were tested. Research on active mass resulted in predeterminated pore structure of PbO_2 and a longer service life. The optimum design will be a module of five cells of which laboratory samples were produced and tested successfully. The realization on an industrial scale was not possible within this project due to the limited financial support. A pilot plant with a maximum output of 250 kW and a 2.2 h duty time was erected and successfully put into service. It is controlled by a processing computer.

33783 **(ORNL/TM—8714) Physical chemistry of molten-salt batteries. Final report, October 1, 1981-September 30, 1982. LiCl precipitation from LiCl-KCl anolyte in porous Li-Al electrodes.** Vallet, C.E.; Heatherly, D.E.; Heatherly, L. Jr.; Braunstein, J. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 27p. NTIS, PC A03/MF A01. Order Number DE83012527.

Composition gradients such as those predicted to occur during discharge of porous Li-Al negative electrodes of Li/S batteries with LiCl-KCl eutectic electrolyte were generated and measured in the LiCl-KCl anolyte of an electrolysis cell with Li-Al electrodes. LiCl precipitation during electrolysis was observed by two-dimensional scanning of electrolyte composition in the front part of quenched porous Li-Al anode sections using SEM/EDX. The distribution of sites of increased or decreased LiCl concentration, LiCl saturation and precipitation was mapped. Cathodic regions were observed near the cell walls. Preliminary results of analysis by Auger spectroscopy confirm LiCl precipitation in the porous anode.

33784 **Emergency power supply.** Muenchen, Germany, F.R.; Deutsches Museum von Meisterwerken der Naturwissenschaft und Technik (1979). vp. (CONF-7903106—).

From Technical symposium on emergency power supply; Muenchen, F.R. Germany (29 Mar 1979).

Separate abstracts were prepared for five papers in this symposium proceedings. (LEW)

29 ENERGY PLANNING AND POLICY

33785 **(DOE/IG—0008/4) Office of Inspector General FY 1983 semiannual report, October 1, 1982-March 31, 1983.** (Department of Energy, Washington, DC (USA). Office of Inspector General). 31 May 1983. 44p. DOE Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830.

Activities of the IG Office during the first half of FY 83 are summarized. This is followed by a three-part section on audit, inspection, and investigative activities which deals with the problems uncovered, corrective recommendations, and the implementation progress made by the Department of Energy on the recommended corrective actions. The fourth section discussed other significant activities during the report period. Appendices include reports on which corrective action is incomplete and lists the public audit and inspection reports issued during this period. (PSB)

33786 **(DOE/IG—0160) Peoria weatherization program.** (Department of Energy, Washington, DC (USA). Office of Inspector General). 10 Jun 1981. 28p. K. Order Number DE83008187.

Report to the Secretary.

A review of the DOE weatherization program as it was carried out by a local agency in Peoria in a six county area of central Illinois disclosed a failure of the agency to properly weatherize houses, account for funds, or to adequately serve the outlying counties. It also points out a failure by the appropriate state agencies to properly oversee the work of the local agency. IG recommended that DOE require faulty work to be redone. Also the IG recommended that the State's practice of encouraging local agencies to seek unnecessary advances of funds be stopped; that required audits be conducted of the subgrants made to the Peoria agency; and that it be verified that the Peoria agency is providing adequate weatherization services to the outlying counties. In memoranda appended to the report, the Acting Regional Representative and the Acting Assistant Secretary, Conservation and Renawable Energy, agreed with these recommendations, and advised that corrective actions have been taken. (PSB)

33787 **(DOE/IG—0190) Sick leave administration.** (USDOE Office of Inspector General, Washington, DC). 14 Feb 1983. 15p. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Report to The Secretary.

Where an audit of DOE sick leave showed an increased usage from 7.7 days per staff year in 1978 to 9.1 days in 1981, IG recommends that management implement procedures to reduce the potential for abuse of sick leave. The audit focussed on the Office of Equal Opportunity, Office of Minority Economic Impact, Office of Industrial Relations, Energy Information Administration, selected elements of Economic Regulatory Administration, New York Support Office, and the Philadelphia Support Office where 1981 sick leave was three times greater than for 1980. DOE comments concur with these recommendations: leave slips for any absence in excess of eight consecutive hours, unless local payroll instructions for reporting time and attendance require submission for a period of shorter duration; suitable evidence of illness for sick leave in excess of three days. This could be either a medical certificate or a signed statement by the employee indicating the reason why medical attention was not obtained. Supervisors to counsel employees who demonstrate a pattern of frequent sick leave usage of short duration; employees to submit a medical certification in support of any advance of sick leave, and that the approval of both the first and second level supervisors be obtained; and headquarters and field locations, at least annually, publish a notice reminding supervisors and managers of their responsibilities for the control and administration of leave, including sick leave.

33788 **(NP—3770060) Energy industry of Bolivia 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Oct 1982. 18p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770060.

Portions are illegible in microfiche products.

By providing some significant data a short survey of the energy situation of the country is given. After some remarks on the

energy policy the author describes the developments with regard to various energy carriers and power generation. Furthermore, some important figures on the foreign trade are given.

33789 **(NP—3770094) Chile - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 17p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770094.

Portions are illegible in microfiche products.

The energy situation of Chile is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33790 **(NP—3770095) Mexico - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Dec 1982. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770095.

Portions are illegible in microfiche products.

The energy situation of Mexico is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 33827, 33852, 33855, 33856, 33857, 33858, 33877

33791 **(EUR—8291-EN) MEDEE 3: first results for Ireland and data collection. Final report.** Killen, L. (National Board for Science and Technology, Dublin (Ireland)). 1983. 109p. European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

This report is divided into two parts, the first of which, data collection, forms the major part of the work carried out to date. The second part contains information on the data base variables. Ireland's participation in the project for implementing the long-term energy-demand models commenced in a small way in 1979 with collection of a database for MEDEE-2. In 1980 it was decided that MEDEE-3 should be implemented if at all possible and an expert group met to discuss the project. The relationship between this model and the other models, developed in the EEC Programme of Energy Systems Analysis and Strategy Studies, is described.

33792 **(Juel-Spez—166) Embedding energy industry into economy.** Hoepfinger, E.; Drepper, F.; Heckler, R.; Schwefel, H.P. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung). Jul 1982. 242p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83750896.

In contrast to other studies of this kind the authors have starting from global economic aspects via aspects of national economy, tried to get to the level of single technologies. The solutions of the problems are exemplified by the following four items: a) an international energy carrier/technology-trade model, b) a dynamic bisectoral balance model of the German economy, c) a technologically desaggregated approach towards treating the price/cost dependent balance between energy demand and supply and d) determining factors in the heat demand of one- and two-family houses. In the appendix a programming system for the integration of simulation and optimization is described.

33793 **(PB—83-122564) Production and consumption of non-fuel minerals to the year 2030 analyzed within an input-output framework of the US and world economy (techniques for consistent forecasting of future demand for major minerals using an input-output framework).** Leontief, W.; Koo, J.; Nasar, S.; Sohn, I. (New York Univ., NY (USA)). Jun 1982. 587p. NTIS, PC A25/MF A01.

A study was undertaken to project a set of future production and consumption levels of 26 major non-fuel minerals for the U.S. and the world economy to the year 2030. Alternative assumptions regarding future U.S. and world economic growth and structural change are discussed. The main methodological tools used in the study were the 1972 Input-Output Table of the U.S. Economy and a revised version of the U.N. World Input-Output Model. Discussions of the role of resources in the economy, a review of past U.S. minerals policies, and a summary of previous studies undertaken to project future minerals requirements are included. Problems of potential resource imbalances are addressed.

33794 **(USIP—82-02) Long range energy demand.** Gerholm, T.R.; Meisels, S.; Brandell, L.; Thedeen, T.; Claesson, L.; Naesman, P. (ELKRAFT A.m.b.A., Hellerup (Denmark)). Nov 1981. 80p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750489.

Portions are illegible in microfiche products.

It is shown that the product per capita economic growth and income elasticity equals the relative rate of per capita energy demand growth. Using mathematical models, a general model for long range energy demand is arrived at. Certain parameters have been determined by statistical analysis using historical data for the world divided into seven major regions and corresponding to the period 1950-1970. Using pre 1973 data only forecasts to 2020 are made for all seven world regions and for Sweden. The results are compared with actual outcome for 1979 and with similar projections published by WEC, IIASA, Exxon and the World Bank.

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 33147, 33161, 33162, 33320, 33822, 33828, 33851, 33854, 33865, 33877

33795 **(DOE/MA—0106) Report to Congress on the Small-Business Program of the Department of Energy.** (USDOE Assistant Secretary for Management and Administration, Washington, DC. Directorate of Procurement and Assistance Management). Apr 1983. 38p. NTIS, PC A03/MF A01. Order Number DE83011808.

Opportunities for small businesses to participate and the extent to which they are participating in projects and activities funded by DOE are discussed. The involvement of small and small disadvantaged, science-based companies in DOE organizational elements are listed by element.

33796 (INIS-mf—7475-Vol.C, pp vp) **Energy-development correlation and the nuclear strategy in Brazil. Part 1.** do Amarante, J.A.A. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.C).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

The existence of clear correlation between the economic growth of a nation and its energy requirements, in particular of electricity, is demonstrated through the statistical analysis of the behaviour of 47 countries.

33797 **(NP—3770048) Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea.** Vincent, D. (Kiel Univ. (Germany, F.R.). Inst. fuer Weltwirtschaft). May 1981. 48p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770048.

By applying a general multisectoral balance model the author tries to quantify the difficulties of adaptation caused by the price policy of the OPEC to which the industries of countries in want of energy raw materials like South Korea, are subject. He considers various assumptions on the macroeconomic framework, the labour market and the export demand of Korea. Although the numerical results are particularly related to Korea, the generalization of the statements is also applicable to other countries which are short of energy raw materials.

33798 (PB—83-133843) Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report. Konings, M.; Rouland, O. (Commission of the European Communities, Luxembourg). [nd]. 83p. NTIS, PC E05/MF E05.

The macro-economic model EURECA (European Energy Consumption Analysis) is used for forecasting final aggregated demand and costs for the EEC countries as well as for the study of the impact of the energy variables on the principal macro-economic activities. The report describes its achievements and covers two distinct areas: (1) an appreciation of the performance of the model of the past, with 1977 being the reference year, and of the trends for 1980 - 1990, and (2) an analysis of scenarios and case studies for the same period.

33799 (PB—83-135947) Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final). Elbaum, B.L. (Harvard Univ., Cambridge, MA (USA)). Jun 1982. 475p. NTIS, PC A20/MF A01.

The study is principally concerned with two interrelated aspects of British and U.S. iron and steel industry development, namely with long persistent disparities in wage structure and in industrial structure and performance. The origins of these disparities are traced to a critical formative period before W.W.I, which is accordingly the main period of enquiry. The argument presented links disparity in wage structure to a distinctive trade union impact which reflected and had a reciprocal influence upon, divergent industrial organization. In either country, exclusive unions of strategic process workers were able to maintain downwardly rigid tonnage wage rates, and thereby capture, plant-by-plant, a portion of the benefits of technical change and increasing productivity. But in the U.S., trade union organization met with defeat, while in Britain, union organization was consolidated under a two-tiered structure of bargaining. Union defeat in the U.S. came at the hands of oligopolistic, multi-plant firms. Union success with two-tiered bargaining in Britain was facilitated by comparative industrial fragmentation.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 33164, 34403, 34435, 34439, 34475

33800 (ANL/EES-TM—212-Vol.3) In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 3. Federal Regions V and VII. Garvey, D.B.; Moser, S.B.; Streets, D.G. (Argonne National Lab., IL (USA)). Aug 1982. Contract W-31-109-ENG-38. 411p. NTIS, PC A18/MF A01. Order Number DE83011913.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Clean Air Act Amendments of 1977 and US Environmental Protection Agency regulations set stringent requirements for the control of emissions in areas where the National Ambient Air Quality Standards were being exceeded. This second edition of four volumes updates a previous five-volume summary of nonattainment area designations and attainment strategies of the states, bringing the information up to date as of December 31, 1981. This edition also includes state information that was presented in another report prepared as a supplement to the first edition - information on Prevention of Significant Deterioration Class I areas and on coal quality and reserves. In addition, the volumes contain new state-level data on power plants, industrial boilers, 1979 SAROAD monitor readings, state implementation plan emission limits for SO_2 and particulate-matter sources, and maps of counties and Air Quality Control Regions.

33801 (IIUG—81-10) Formulation and implementation of air quality control programmes. Knoepfel, P.; Weidner, H. (Wissenschaftszentrum, Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft). 1981. 40p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750061.

Modified version of a German article entitled 'Normbildung und Implementation: Interessenberuecksichtigungsmuster in Programmstrukturen von Luftreinhaltepolitiken' in: R. Mayntz (ed.), Empirische Implementaionsforschung (Koenigstein/Ts.: Athenaeum, 1980).

This article investigates some central aspects of the relationships between programme structure and implementation of sulphur dioxide air quality control policies. Previous implementation research, primarily adopting American approaches, has neglected the connections between the processes of programme formulation and implementation. 'Programme', as the key variable in implementation studies, has been defined too narrowly. On the basis of theoretical and conceptual reflections and provisional empirical results from studies in France, Italy, England, and the Federal Republic of Germany, the authors demonstrate that an integral process analysis using a more extended programme concept is necessary if patterns of interest recognition in policies are to be discovered. Otherwise, the still important question of critical social science cannot be answered, namely, what is the impact of special interests upon implementation processes.

33802 Monetary values of freshwater fish and fish-kill counting guidelines. *American Fisheries Society, Special Publication;* No. 13, 1-40(1982).

A set of documented monetary values of freshwater fish occurring in the United States is presented that may be used to assess the value of fish destroyed in fish kills. (ACR)

2904 Natural Resources

REFER ALSO TO CITATION(S) 33860

33803 (NP—3770056) World's energy sources - possibilities and limits. (Deutsche Shell A.G., Hamburg (Germany, F.R.)). Jul 1982. 11p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770056.

Portions are illegible in microfiche products.

In a brief and popular manner the possibilities of energy sources like petroleum, natural gas, coal, water power, nuclear energy, biomass, geothermal energy, solar energy, tidal energy and wind energy as contributions to the world-wide energy supply until the year 2000 are demonstrated.

33804 (PB—83-134759) Non-governmental research and development investments in selected energy technologies. Summary report. (National Science Foundation, Washington, DC (USA). Div. of Policy Research and Analysis). Jun 1982. 14p. NTIS, PC A02/MF A01.

Projections for private sector research and development investments in selected fossil and solar energy technologies as well as energy conservation technologies are presented. Continued Federal participation in solar thermal energy is considered vital to the successful transfer of this technology to the private sector. However, a decline of Federal funding of RandD in photovoltaics will not result in a substantial flight of private capital from this area. While some companies consider coal-bed methane to be commercially viable, the majority of the coal industry believes this is an unsafe technology which will introduce unknown safety hazards to mining operations. Greater Federal efforts in oil shale and coal liquefaction are sought as is long-range funding in RandD in these technologies by the Department of Energy. Investment by private firms in enhanced oil recovery is expected to continue.

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 33097, 33327, 33350, 33804, 33874

33805 (DFE—42) Energy R and D in Sweden. (ELKRAFT A.m.b.A., Hellerup (Denmark)). 1982. 45p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750476.

Portions are illegible in microfiche products.

In the Spring of 1981 the Swedish Parliament decided that the Government support for energy research and development shall continue in a third programme covering the fiscal years 1981/82-1983/84. This new three-year programme is estimated to cost SEK

1400 million or about $250 million. The activities will be mainly directed to renewable and indigenous energy sources, such as forestry energy, peat, energy forest, wind energy and solar heating. Energy conservation in buildings and in industrial processes will also receive a big portion of the funds within the programme. There is also a strong emphasis on methanol as an alternative fuel for vehicles. In this report the Energy Research and Development Commission (DFE) presents information on the aim, structure, scope and organization of the Government energy research and development programme and related activities in the energy field.

33806 **(DFE—49) Knowledge about energy. An inventory of Swedish energy systems studies and some hypothesis of research needs.** Svensson, J.E.; Hakkarainen, E.; Eriksson, A. (ELKRAFT A.m.b.A., Hellerup (Denmark)). Feb 1982. 161p. (In Swedish). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750475.

Portions are illegible in microfiche products.

An inventory of Swedish energy systems studies is presented, with descriptions of the problems that were studied, the hypotheses and methods used and the types of result obtained. Comments on research needs and objectives in the area are given, and suggestions for some special research projects are put forward.

33807 **(DFE—50) Energy of tomorrow. Description of techniques and appraisement of the future.** (Delegationen foer Energiforskning, Stockholm (Sweden)). 1982. 317p. (In Swedish). NTIS (US Sales Only), PC A14/MF A01. Order Number DE83750521.

Portions are illegible in microfiche products.

The book gives a survey of energy RzD. The supply and the utilization of energy are described. The possibilities to vary energy systems are dealt with. Contributuions and grants to energy research are presented and an assessment of the potential of different techniques is made.

33808 **(DOE/NBM—3012268) Federal energy R and D priorities: report of the Energy Research Advisory Board.** (Department of Energy, Washington, DC (USA)). Nov 1981. 55p. NTIS, PC A04/MF A01. Order Number DE83012268.

A review was made of DOE R and D priorities on overall federal energy programs. It is recommended that funding relative to the President's FY82 budget request for the science and technology base programs be increased in some programs and remain the same in others. Within these programs high priority should be given to: research on the phenomena governing accumulation of CO_2 in the atmosphere, climatic effects of this accumulation, tolerable levels of CO_2, and ways to control CO_2 accumulations, and research into acid rain. In the electric supply sector, priority should be given to supporting: nuclear waste isolation research and demonstration; conventional reactor systems and safety; the LMFBR base program; and uranium enrichment R and D. Programs in which reductions are recommended include: magnetic fusion; the Clinch River breeder, the light water breeder, electricity transmission, and high temperature geothermal. Phase-out of funding is proposed for hydropower and magnetohydrodynamics. In fuels supply technologies, the Board believes that technologies such as enhanced oil and gas recovery will be adequately supported by the private sector. The Board also recommends that: the major federal effort in synthetic fuels research and development be directed at innovative concepts at the laboratory and small pilot-plant scale; the funding level for R and D directed at producing liquids and gases from biomass and the production of alcohol is at an appropriate level; and that parts of Advanced Research and Environmental Control Technology concerned with technologies to control SO/sub x/, No/sub x/ and particulates emissions be increased and strengthened. On an overall basis within the Department of Energy, it was concluded that R and D funding for energy conservation and end-use technology is underfunded. The Board believes that if its recommendations are implemented, a net reduction in DOE's budget will result.

33809 **(N—8313058) Guide to programs, fiscal year 1983.** (National Science Foundation, Washington, DC (USA)). 1982. 86p. (NSF—82-57). GPO.

The criteria for the selection of research projects are presented. Research programs in the areas of mathematical and physical sciences engineering biological, behavioral, and social sciences, astronomical, atmospheric, Earth, and ocean sciences etc., are discussed.

33810 **Demonstrating energy-efficient developments.** Hollander, E. (EPRI Office, Washington, DC). *EPRI (Electric Power Research Institute) Journal;* 8: No. 2, 26-28(Mar 1983).

The American Public Power Association (APPA), representing 1750 local, publicly owned utilities, helps its members by demonstrating energy-efficient applications. APPA's DEED program emphasizes the small-risk field testing of projects that have wide application, such as energy storage, load management, solar, and municipal solid waste projects. Two of DEED's 35 projects, the use of Exxon donor solvent to fuel diesel generators and a biomass study of gasified corncobs for power generation, have been supported by the Electric Power Research Institute. Three other programs involving energy services planning and exchanges and a public-power innovations list have evolved from member needs. (DCK)

33811 **EPRI joins reactor project.** *EPRI (Electric Power Research Institute) Journal;* 8: No. 2, 29-30(Mar 1983).

Six large-scale reactor accident tests at Sweden's Marviken nuclear power plant are part of a worldwide program to see if current public risk estimates are overstated. The Electric Power Research Institute is participating in this project as well as in others to bring patented inventions into commercial markets, demonstrate binary-cycle technology for geothermal power plants, and a computer-aided power distribution line and structure design. (DCK)

33812 **How power options stack up.** Whitaker, R.; Appleton, G.; Loth, R.; Vejtasa, S. *EPRI (Electric Power Research Institute) Journal;* 8: No. 2, 6-13(Mar 1983).

The Electric Power Research Institute uses a system of comparative economic analyses developed over a 30-year period and based upon six regional data bases to assess the potential of technology options and to identify research needs. The system defines performance characteristics, estimates costs, and predicts when trends in research and development funding and their progress will reach the commercial stage. Both economic and intangible variables are given an assumed value based on regional differences. The resulting assessments are useful to investment and expansion decisions. 2 figures. (DCK)

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 33181, 33236, 33749, 33847, 33850, 34893

33813 **(IKE-K—69) Economic consequences of the delay in the nuclear energy developing programme in Baden-Wuerttemberg considering topical cost-analyses on the power generation sector.** Weible, H. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). Apr 1982. 78p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750095.

In 1977 and the following years detailed comparisons of costs regarding power generation on the basis of black coal and nuclear energy were carried out by various institutions. Since then there have been some changes in the initial data of the calculations. The first main part (chapter 2) of the present report deals with a calculation of the power generation costs in the mentioned plants which was updated for the middle of 1981. Within the framework of the Baden-Wuerttemberg nuclear energy developing programme considerable delays have accurred. The second main part (chapter 3) deals with the additional burdens arising for the final consumers. In the concluding chapter 4 an estimation of the maximum sensible utilization potential of nuclear energy for covering the power demand of Baden-Wuerttemberg until the year 2000 is given. The most essential aspects are: the futur power consumption growth, the rate of power imports and as a framework condition, the brown coal electrification contracts.

33814 (INIS-mf—7475-Vol.C, pp vp) **Energy-development correlation and the nuclear strategy in Brazil. Part 2.** do Amarante, J.A.A. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.C).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

Special attention is called for the extremely high nuclear energy potential available in Brazil, which is equivalent to the energy that could be generated by all our huge hydroeletric potential under continuous operation for more then 9 thousand years.

33815 (INIS-mf—7498, pp vp) **Alternate pathways for the nuclear energy economy in Israel.** Greenspan, E. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33816 (INIS-mf—7498, pp vp) **Production of nuclear fuel in Israel. Feasibility and justification.** Ron, M.Z. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33817 **(INIS-mf—7502) Potential for an Australian uranium industry.** Silver, J.M. (Macquarie Univ., North Ryde (Australia). School of Earth Sciences). Jun 1982. 147p. NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780409.

The production of uranium and its part upgrading to enriched uranium for export could be equivalent to 20-25 per cent of Australia's future export income from coal. Australia could be supplying 15,000 tonnes U/yr. and enrichment services of 2.5 million SWU/yr. by 2000. The principles of nuclear energy, nuclear power reactors and the nuclear fuel cycle are described and the relationship between nuclear power and the requirements for uranium and the other steps in the fuel cycle is discussed. Estimates are given of the future world supply-demand balance for each step in the fuel cycle. A survey is made of world uranium resources and fuel cycle upgrading facilities. The costs of production and pricing are assessed in relation to the potential for an Australian industry. Comments are made on the possibility that Australia could provide the repository for both low-level radioactive waste from small countries and the bulk of the world's high level waste. The impact of a uranium industry on the Australian economy is discussed.

33818 **(KFK—3295) Results of research- and development works 1981 of the Main Department of Engineering.** (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Ingenieurtechnik). Feb 1982. 37p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750103.

The works concentrate on the development of measuring techniques and -methods, on the planning of test facilities, and on the performance of engineering development work for operation- and test plants among other things for the Fast Breeder Project (PSB), the fusion technology, the Project for Reprocessing and Waste Treatment (PWA), the Nuclear Safety Project (PNS) and for non-nuclear research and technology. As to the last-mentioned subject especially works for the removal of spent nuclear facilities and the spallation neutron source have been carried out.

33819 **The treatment of uncertainties in risk for regulatory decision making.** Baybutt, P. (Battelle's Columbus Lab., OH); Cox, D.C.; Denning, R.S.; Kurth, R.E.; Fraley, D.W.; Heaberlin, S.W. pp 315-323 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Post Chester, NY, USA (20 Sep 1981).

This paper describes research conducted in an ongoing program at Battelle to develop and adapt decision analysis methods for regulatory decision making. A general approach to risk-based decision making is discussed. The nature of uncertainties in risk assessment is described and methods for their inclusion in decision making are proposed. The use of decision analysis methods in regulatory decision making and the consideration of uncertainties is illustrated in a realistic case study.

33820 **Evolution and present situation of nuclear energy legislation in Brazil.** da Silveira, P.R.N.; Solito, J.; de Goes Fischer, M.D.; de Oliveira, S.C.C. Rio de Janeiro, Brazil; Comissao Nacional de Energia Nuclear de Brazil (1980). 9p. (In Portuguese). (CONF-8006246—5).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The present status of nuclear legislation in Brazil is presented. The principal legislative acts are analysed, regarding the evolution of nuclear activities. Special reference is made to the Brazilian policy on the peaceful uses of nuclear energy. (A.L.).

2907 Transport And Storage

REFER ALSO TO CITATION(S) 33852

2908 Waste Heat Utilization

REFER ALSO TO CITATION(S) 33934

33821 **(NE/FBA—81-4) Heat storage in ground water.** Hyden, H. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jan 1981. 103p. (In Swedish, English). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750478.

Portions are illegible in microfiche products.

The amount and distribution in time of waste heat in cooling water and wastewater from the Extraco factory in Stidsvig, Klippan municipality, Sweden has been assessed. On the basis of available field data, design and operation of an aquifer has been studied with the help of a mathematical simulation model of heat storage, GAFETTA. With respect to control possibilities and efficiency a five-spot storage system seems to be the best solution. Due to the poor heat insulation of the storage facility in this specific case, only some 50 per cent of the amount of energy stored can be recovered. The greatest loss is to the atmosphere through the covering layers, while heat transfer to the surrounding groundwater is small. Heat storage of low temp. (below 30 degrees C)should not involve any particular provblems in the type of aquifer studied, provided that the hydraulic properties of the aquifer can be assessed. In the first place, heat from the cooling water should be utilized, but the heat from the sewage water can also be used via a heat exchanger. Heat supply systems based on the waste heat source can be implemented in a first phase involving existing buildings and in a second phase involving planned new housing areas. For the existing buildings a solution with individual heat pumps should be most appropriate while the new housing areas should be supplied by central heat pump stations and dsitrict heating systems designed for low temperature distribution. For the two phases, the following data apply: Construction cost 10 and 16 MSEK respectivily, consumption of electricity 1.25 and 2.64 GWh/a and oil saving 528 and 1085 m^3. The economic feasibility of phase 1 depends on the extent of governmental subsidies and the number of connections to the system. Phase 2 is immediately economically feasible with subsidies and can be expected to become feasible without subsidies within a short time due to real price escelations of energy.

2910 Conservation

REFER ALSO TO CITATION(S) 33313, 33891, 33900, 33901

33822 (DFE—47) Effect of reduced dependence on oil. Some economic long-sighted calculations. Oettinger, C. (Delegationen foer Energiforskning, Stockholm (Sweden)). Feb 1982. 91p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750459.

Portions are illegible in microfiche products.

The calculation of effects and the discussion of steering is connected to the latest government bill on energy. The discussion deals with the following items: A) the strength of the controlling means in order to reach certain goals of energy use. B) The effect of various alternatives of energy on national economy. In order to make a prognosis it has been necessary to introduce sensitivity analysis for the variation of the economic growth and the increase of oil prices. A reference calculus has been made for the year 1990 , the values of which part with the ones of the government bill. A taxation system has been investigated which means higher taxes on oil and coal. The consumption of energy might thus be reduced without secondary negative effects on other economic and political objects. The model which has been used for the calculation is a multisectoral growth model. The input data are taken from the national accounts of the year 1979.

33823 Energy savings and conservation. Yared, R. *Options;* 1-5(Aut 1982).

The present oil supply and demand situation has inspired two opposing views of the energy future: the strong belief that energy savings and conservation, induced by rocketing prices, will endure, and the fear that today's oil glut masks the threat to tomorrow's energy users. After an extensive statistical study, economist Claire P. Doblin is afraid that the common failure to understand energy savings and energy prices will lead to another energy crisis. 2 figures.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 33096, 33146, 33320, 33794

33824 (BMFT-FB-T—83-001) Solar energy futures in a Western European context. Nakicenovic, N.; Messner, S. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 290p. (In German). NTIS (US Sales Only), PC A13/MF A01. Order Number DE83750857.

Portions are illegible in microfiche products.

The study considers three limiting scenarios that specify possible but not necessarily likely transitions to sustainable energy future for Western Europe. Two scenarios consider exclusively solar futures - one based on centralized solar technologies (hard scenario) and the other on decentralized, user-oriented technologies (soft scenario). The third scenario, based on nuclear technologies, incorporates an intermediate degree of centralization in the energy system and serves as a comparison to the two exclusively solar scenarios. All three scenarios lead to sustainable energy futures before the year 2100, which is the time horizon of the study. While all three scenarios eliminate Western Europe's dependence on domestic and foreign fossil energy sources, the Hard Solar scenario requires substantial imports of solar produced hydrogen. The scenarios are based on dynamic balances of energy demand and supply using detailed models to achieve consistency. The overall implications of each scenario are that fundamental but different changes of the whole energy system, economic structure and life-styles are necessary in order to achieve sustainable energy futures in Western Europe.

33825 (BMFT-FB-T—83-002) Solar energy futures in a Western European context. Nakicenovic, N.; Messner, S. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 26p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750860.

The study considers three limiting scenarios that specify possible but not necessarily likely transitions to sustainable energy futures for Western Europe. Two scenarios consider exclusively solar futures--one based on centralized solar technologies (Hard scenario) and the other on decentralized, user-oriented technologies (Soft scenario). The third scenario, based on nuclear technologies, incorporates an intermediate degree of centralization in the energy system and serves as a comparison to the two exclusively solar scenarios. All three scenarios lead to sustainable energy futures before the year 2100, which is the time horizon of the study. While all three scenarios eliminate Western Europe's dependence on domestic and foreign fossil energy sources, the Hard Solar scenario requires substantial imports of solar produced hydrogen. The scenarios are based on dynamic balances of energy demand and supply using detailed models to achieve consistency. The overall implications of each scenario are that fundamental but different changes of the whole energy system, economic structure and life-styles are necessary in order to achieve sustainable energy futures in Western Europe.

33826 (DOE/OR/20837—1) Analyzing industrial energy demand: organization and analysis of information. (Science Applications, Inc., Oak Ridge, TN (USA)). 22 Feb 1983. Contract AC05-81OR20837. 128p. NTIS, PC A07/MF A01. Order Number DE83012385.

An organizational and analysis framework for data and information collection efforts was designed to aid in the assessment of energy and electricity use in complex industries. Since many products in the chemical industry offer complex market situations, much of the material in the report dealt with the chemical industry. However, the data organization and analysis framework is general in nature and can be easily adapted for analysis of other industries. Two examples were undertaken: the chlor-alkali industry (SIC 2812) and the industrial gas industry (SIC 2813). A framework for guiding and organizing the data collection process that is based on the economic theory of the firm was found to be a useful tool. The procedures for analyzing the data, also based on the economic theory of firm behavior under various market conditions, were found useful for developing logical explanations of both past trends and the current situation, and by implication would be useful for evaluating future patterns in energy and electricity use. The procedures provide sufficient flexibility to insure their usefulness with data available at various levels of detail.

33827 (Juel-Spez—133/Bd.2) Analysis and evaluation of energy forecasting for the Federal Republic of Germany. Vol. 2. Schmitz, K.; Hildebrandt, T.; Kollmann, H.; Terhorst, W.; Voss, A. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung). Nov 1981. 131p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750063.

By letter of September 29, 1980 the Federal Minister of Economy entrusted the nuclear research centre at Juelich with a research project to the purpose of evaluating the latest investigations on energy by both national and international groups in respect of - the causes of divergent results the forecasting method used. The research project was concerned with the following studies and forecastings on energy: National studies and forecastings, 1. Report of the special enquiry commission of the German parliament entisted 'Future Nuclear Energy Policy', 2. 'Energy at the twining-point', report of the ecological institute at Freiburg, 3. Forecasting of ESSO AG for the year 1980, 4. Forecasting of BP Germany for the year 1980, 5. Energy scenarios of Shell Germany for the year 1980 6. Energy forecasting of VEBA AG for the year 1980. International studies and forecastings, 1. Report of the 'Energy Systems Program Group' of the International Institute for Applied Systems Analysis, 2. Papers from the World Power Conference, 3. Report of the World Coal Study, 4. The 'Global 2000' report. The entire report on the research project divides into two volumes. Volume I contains an explanation of the aims and tasks, a short chapter on the possibilities and limitations of forecastings and a brief summary of the essential results. Volume II, refered to here, deals more in detail with the different methods of work and important premises of the studies and forecastings investigated. Moreover the various methodical approaches are characterized and classified in the supplements to Vol. II and a concise description of the computer model of the inquiry commission is given.

33828 **(NP—3750458) STOSEB 80. Regional energy plan.** (Storstockholms Energi AB, Stockholm (Sweden)). Sep 1981. 263p. (In Swedish). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83750458.

Portions are illegible in microfiche products.

STOSEB 80 will provide the conditions for secure, flexible, long-term, economical and ecologically optimum energy supply to the region, which is the Greater Stockholm area. The actual situation of energy supply and use in 1978 is presented. A prognosis is made on to the year 1990. Various distribution systems and heating techniques are discussed and energy conservation methods are referred to.

33829 **(NP—3770051) Energy industry of Guatemala 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Sep 1982. 8p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770051.

Portions are illegible in microfiche products.

By providing some significant data, a short survey of the energy situation of the country is given. After some remarks on the energy policy the author describes the developments with regard to various energy carriers and power generation. Furthermore, some important figures on the foreign trade are given.

33830 **(NP—3770059) Energy industry of France 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Oct 1982. 28p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770059.

Portions are illegible in microfiche products.

By providing some significant data a short survey of the energy situation of France is given. After a summary of the general development on the energy sector the author reports on the planning and measures within the framework of national energy policy. These remarks on energy policy are followed by a description of the developments with regard to various energy carriers and power generation. Furthermore, some important figures on the foreign trade are given.

33831 **(NP—3770092) Swiss energy concept.** (Eidgenoessische Kommission fuer die Gesamtenergiekonzeption, Bern (Switzerland)). Nov 1978. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770092.

Portions are illegible in microfiche products.

The major lines of development, statements and findings of the two-volume final report are summarized.

33832 **(NP—3770093) Brazil - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Dec 1982. 40p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770093.

Portions are illegible in microfiche products.

The energy situation of Brazil is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33833 **(NP—3770096) Uganda - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 17p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770096.

The energy situation of Uganda is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33834 **(NP—3770097) Cyprus - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 9p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770097.

Portions are illegible in microfiche products.

The energy situation of Cyprus is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33835 **(NP—3770098) India - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 22p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770098.

The energy situation of India is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33836 **(NP—3770099) Turkey - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 24p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770099.

Portions are illegible in microfiche products.

The energy situation of Turkey is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33837 **(NP—3770100) Luxembourg - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 28p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770100.

Portions are illegible in microfiche products.

The energy situation of Luxembourg is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

33838 **(NP—3770104) Energy supply assurance in Switzerland.** (Eidgenoessische Kommission fuer die Gesamtenergiekonzeption, Bern (Switzerland)). Nov 1978. 130p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770104.

Supply assurance of the various energy sources is discussed on an international scale and for the specific situation of Switzerland. Storage and management on a national level are discussed.

33839 **(NP—3770108) Nigeria - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 18p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770108.

Portions are illegible in microfiche products.

This is a brief survey of Nigeria's energy situation containing some significant data. After some remarks on the energy policy, the developments regarding individual energy sources and power generation are described. The importance of petroleum exports for the Nigerian balances of trade and payments is particularly emphasized and some important figures are appended as to the German-Nigerian petroleum relations.

33840 **(NP—3770110) Madagascar - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 8p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770110.

The general developments on the energy sector in Madagascar are reviewed, and national and international energy policies are commented on.

33841 **(NP—3770112) Swiss energy concept. Final report. Vol. 2.** (Eidgenoessische Kommission fuer die Gesamtenergiekonzeption, Bern (Switzerland)). 1978. 490p. (In German). NTIS (US Sales Only), PC A21/MF A01. Order Number DE83770112.

Portions are illegible in microfiche products.

Vol. 2 of the final report presents various scenarios of Swiss energy supply with the following variants: 1. Development without state interference; 2. energy policy on the basis of present constitutional law; 3. energy policy on the basis of new constitutional legislation; 4. stabilisation. These scenarios are discussed against the background of energy shortage and compared. The possibilities of constitutional law are investigated, and some general recommendations are given.

33842 (PB—83-928600) **International energy statistical review. Monthly reports.** (Central Intelligence Agency, Washington, DC (USA)). 1983. vp. Paper copy available on subscription, North American Continent price $45.00/year; all others write for quote. Also available in single copies.

The International Energy Statistical Review provides current information and comparisons with recent years for a variety of topics on international energy; almost all concern some aspect of the petroleum and natural gas industries. Six charts deal respectively with total Free World oil production, OAPEC oil production, non-Arab oil production, Free World and USSR oil production, inland oil consumption, and net oil imports. In general, the time period covers the last four or five years. The remainder of the Review is made up of 31 tables, covering such disparate topics as production, capacity, reserves, trade, consumption and stocks. Areas covered include the world, Free World, OPEC, OAPEC, OECD, selected developed countries, Western Europe, China, USSR, and Eastern Europe.

33843 **Modulation of fossil fuel production by global temperature variations.** Rust, B.W. (National Bureau of Standards, Washington, D.C.); Kirk, B.L. *Environment International;* 7: No. 6, 419-422(1982).

An analysis of the fossil fuel production record since 1860 shows that the exponential growth in production is modulated in the inverse sence by variations in global average temperature. Taking this modulation into account shows that the underlying rate of increase is about 25% less than the widely quoted 4.3% annual rate. This modulation may also produce a partially ameliorating feedback if the often predicted carbon dioxide greenhouse effect actually materializes.

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 33021, 33097, 33163, 33181, 33793, 33820, 33864, 33866, 34475, 34952

33844 (DOE/PE/70431—T1) **Analysis of options for structural reform in electric-utility regulation. Report of the NGA Task Force on electric utility regulation.** (National Governors' Association, Washington, DC (USA)). 7 Jan 1983. Contract FC01-82PE70431. 49p. NTIS, PC A03/MF A01. Order Number DE83011511.

In June of 1982, an Electric Utility Task Force was formed under the auspices of the National Governors' Association. The Task Force members were charged with developing recommendations for any needed changes in the regulation of electric utilities and with identifying consensus solutions to the myriad of associated regulatory problems. This report represents the consensus view of the Task Force on the problems and potential options for addressing these problems. The Task Force members agree that the primacy of state regulation has been a desirable aspect of our traditional electric utility regulatory system and that any preemption of state authority in this field should be vigorously opposed. They also concluded that changes in three areas - regional power planning and regulation, sorting out of federal and state responsibilities, and benefit-sharing approaches - would be desirable in order to reduce multi-state conflicts and increase the opportunity for regulation which insures system reliability at the lowest possible long term cost. (DMC)

33845 (INIS-mf—7475-Vol.A, pp vp) **Nuclear energy and the rules of environment protection.** de Jesus Zerbini, E.C.G. de; Oliveira, H.A. (Companhia Energetica de Sao Paulo (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A19/MF A01. (CONF-8104136—Vol.A).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

Classifying the norms of atmospheric protection as preventatives (direct or indirect) and reparatives, existing legislation in the nuclear field is analysed with emphasis given to the actions taken by the CNEN in exercising its normative powers.

33846 (INIS-mf—7475-Vol.B, pp vp) **National Energy Balance: recent evolution and perspectives.** Gomes, F.M. (CEPEL, Rio de Janeiro (Brazil)); de Araujo, J.L.R.H. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia). 1981. (In Portuguese). NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.B).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

The Ministry of Mines and Energy has just issued the National Energy Balance for 1980, restarting the series discontinued in 1979, when the Brazilian Energy Model was published instead. Using data from these two documents we try to analyze the recent evolution of the Brazilian energy consumption and point out the limitations of the BEN-80 as tool to understand the Brazilian energy structure.

33847 (INIS-mf—7481) **Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission.** Altner, G.; von Ehrenstein, D. (Bremen Univ. (Germany, F.R.)). 1981. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780408.

The authors discuss the principles and perspectives of a timely limited compromise and provide a systematic comparison of the four paths of energy. The following assessment criteria are used: sufficient supply, supply safety, risk safety, social compatibility, profitability, ecological efficiency, freedom of action, flexibility and justice. After having defined the compromise for the eighties they give some recommendations for the systematic promotion of the alternatives and consequences research, for the consequences of the nuclear energy utilization, for the operation of light water cooled reactors, for nuclear waste management, for fast breeders.

33848 (NP—3770114) **Catalogue of possible energy policy measures.** (Eidgenoessische Kommission fuer die Gesamtenergiekonzeption, Bern (Switzerland)). 1978. 399p. (In German). NTIS (US Sales Only), PC A17/MF A01. Order Number DE83770114.

Portions are illegible in microfiche products.

After an introduction to general legal problems in the field of energy policy, possible measures are discussed in detail, and the legal comments on this catalogue of energy policy measures are summarized.

33849 **Comparison of approaches for developing community energy plans.** Randolph, J. (Virginia Polytechnic Inst. and State Univ., Blacksburg). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 471-475(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Selected energy studies and community experience have been compared to formulate a framework of the appropriate techniques and key political factors involved in developing and implementing community energy plans and programs.

33850 **Legal aspects of search and mining of nuclear ores under Brazilian law.** Godinho, T.M. Rio de Janeiro, Brazil; Companhia de Pesquisa de Recursos Minerais (1980). 39p. (In Portuguese). (CONF-8006246—6).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The legal aspects of mining in the Brazilian law its general principles, the basic concepts and rules established in the constitution of Brazil, in the mining code and in special laws are analysed. The rules for mining and usage of nuclear ores and other ores of interest to the nuclear field are emphasized.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 33146, 33146, 33147, 33161, 33162, 33163, 33164, 33861

33851 (CONF-8002104—1) Interdependence between energy supply and the economy as a whole as an economic problem. Schneider, H.K. (Augsburg Univ. (Germany, F.R.). Inst. fuer Volkswirtschaftslehre). 1980. 20p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770046.

From 6. meeting of business experts; Augsburg, F.R. Germany (27 Feb 1980).

Portions are illegible in microfiche products.

In contrast to former developments when there was a glut of low-price oil, we have to state that - with regard to today's development - energy price shocks caused exogenously may have a strong impact on growth rates and production structure, on the number of people employed, on income levels, price levels, and on the balance of payment. The biggest impact in this respect is caused by the price to be paid for crude oil. The report highlights connections and the effects which will result from this for the economy as a whole.

33852 (DOE/EI/06397—T1) Analysis of transportation network model and applications to coal market studies. (CEXEC, Inc., McLean, VA (USA)). Sep 1980. Contract AC01-78EI06397. 137p. NTIS, PC A07/MF A01. Order Number DE83012521.

Portions are illegible in microfiche products.

The objectives of the study documented in this volume involve an assessment of the usefulness of the Transportation Freight Model (TFM) for further coal transportation analysis. Specific areas of applicability include: Transportation network forecasting and scenario analyses, which require that the input data and the model logic have internal consistency and the output results have credibility; General commodity market policy studies and forecasts, which require that the results of the model have reasonable accuracy; and Small area traffic studies, for which the results of the model must have sufficient detail and confidence to provide control sums. The results of this analysis are based on several tests. Modal share confidence levels are specified by originating region, terminating region and origin/destination pair. Estimated rail costs are qualified by region. Estimated water costs are verified nationally. Results indicate that the TFM data base, when updated from the original 1972 baseline, will yield comparably accurate results; and the TFM logical successfully reflects changes in exogenous conditions. Although results were favorable, experimentation with the model suggests that performance could be improved. Recommendations are included. (DMC)

33853 (DOE/EI/11550—T1) Michigan residential heating oil survey, winter 1982/83. Final report. Holloway, L.J.; Sabine, B.J. (Michigan Dept. of Commerce, Lansing (USA)). May 1983. Contract FG01-82EI11550. 21p. NTIS, PC A02/MF A01. Order Number DE83011850.

Portions are illegible in microfiche products.

In today's markets, oil prices are volatile and increasingly unpredictable. Rapid and significant price changes continue to occur as supply and demand for petroleum change in relation to market conditions. This makes the process of monitoring and projecting energy prices, supply, and demand increasingly important. To achieve these goals, the US Department of Energy (DOE) provided grants to a number of states for the purpose of monitoring # 2 home heating oil prices. This project was designed to provide the states and DOE with current, consistent, and reliable figures on fuel oil prices, and to provide a mechanism for handling consumer inquiries concerning price changes. The Michigan Department of Commerce, Energy Administration, participated in this grant and conducted a survey of petroleum distributors over the winter of 1982/83. The results of this survey are presented in this report.

33854 (DOE/EI/19620—T1) Survey on prices, volumes, and inventory data for residential and rack No. 2 heating oil, October 1, 1982-May 31, 1983. (Rhode Island State Fuel Allocation Office, Providence (USA)). May 1983. Contract FG01-82EI19620. 14p. NTIS, PC A02/MF A01. Order Number DE83012197.

Portions are illegible in microfiche products.

The State of Rhode Island implemented a program to provide monitoring of monthly price movements for residential and rack No. 2 heating oil prices and inventories. The residential and rack price was collected from a list of sampled companies provided by the Federal Department of Energy. Also supplied were estimation formulas as needed in implementing the program. Surveys were conducted by the State Fuel Allocation Office as of the first day of each month during the period October 1, 1982 through May 31, 1983. Inventories available as of the end of the previous month were also collected for tabulation. Dealer margins on October 1, 1982 averaged $0.2102 per gallon. On May 1, 1983, the average margin was $0.2267 per gallon. Combined averages for residential and rack prices are posted on Attachment 4. It is obvious that the residential price trend rises and falls in proportion to changes in the rack price as fluctuations in the market are reflected in the consumer price. Many facets of price and supply are necessary to provide guidance to the Governor and legislative leaders of the state. Continuous monitoring of conditions is a requirement and will be maintained as long as possible. Data procured from subject survey will and it has in the past, prove of extreme value when added to existing data for comparison purposes. Recommendation is made to continue survey process in future years to further enhance data required for decision making.

33855 (DOE/EIA—0391) Model documentation: Short-Term Integrated Forecasting System Demand Model. Rodekohr, M.E. (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Mar 1983. 95p. NTIS, PC A05/MF A01. Order Number DE83011479.

This report documents the demand models used by the Short-Term Integrated Forecasting System (STIFS) to produce the energy-demand forecasts published in the Short-Term Energy Outlook (Outlook). The STIFS demand model is a set of individual energy product demand models which, when combined with electric utility fuel use and natural gas supply and demand estimates, produces projections of demand for total energy and individual energy products. The geographical area of consideration is the United States, defined as the 50 States excluding the territories and islands. The model forecasts on a monthly basis but only quarterly averages are published. All forecasts are made six quarters into the future. The structure of the individual models is summarized, beginning with the energy price models which are used to produce forecasts of the various retail energy prices used in the demand models. Most of these models are econometric, estimated by ordinary least squares for the Cochrane-Orcutt procedure which corrects for autocorrelation. Since all of the models are deterministic, no solution algorithm is used.

33856 (DOE/EIA—0394-Vol.1) Model documentation of the Short-Term Coal-Analysis System. Volume 1. Model overview. (JWK International Corp., Annandale, VA (USA)). Apr 1983. Contract AC01-81EI10775. 31p. NTIS, PC A03/MF A01. Order Number DE83012435.

This is Volume 1 of three volumes of documentation for the Short-Term Coal Analysis System (SCOAL). SCOAL is a set of equations and supporting modules that analyze historical and project future short-term movements in domestic coal market balances caused by both supply and demand changes. All equations are specified to incorporate to the fullest extent possible the principal engineering, economic, seasonal, and institutional factors that affect production, domestic consumption, exports, imports, and changes in end-user stocks. Behavioral and technical parameters that link equation variables are estimated through the application of least-squares analysis to historical time-series of data. SCOAL uses data on coal production, consumption, exports, imports, and stock changes, along with data series on the factors that influence the levels of those variables. These are primarily coal-based electric generation and capacity, domestic and foreign steel production,

coal, oil and natural gas prices, heating-degree-days, and non-steel industrial activity levels. The data series in SCOAL contain elements of trend, seasonality, and periodic strikes and other market disruptions. SCOAL captures the effects of these elements statistically to project future market balances. Figure 1 illustrates the historical quarterly variation in US and regional production of bituminous coal and lignite from the first quarter of 1970 through the second quarter of 1982. Section 2 of this volume presents the structure of SCOAL while Section 3 discusses the basic mathematical specification of SCOAL's equations, and the estimation of parameters. Section 4 contains a description and samples of SCOAL's basic reports, Section 5 describes information flows through SCOAL, and Section 6 discusses its current and potential applications.

33857 **(DOE/EIA—0394-Vol.2) Model documentation of the Short-Term Coal Analysis System. Volume 2. Model description.** (JWK International Corp., Annandale, VA (USA)). Apr 1983. Contract AC01-81EI10775. 170p. NTIS, PC A08/MF A01. Order Number DE83011478.

This is the second of three volumes of documentation for the Short-Term Coal Analysis System (SCOAL) developed by the Coal Data Analysis and Forecasting Branch, Office of Coal, Nuclear, Electric, and Alternate Fuels. The principal aim of SCOAL is to project on a quarterly basis the likely contribution of each of the 26 major bituminous coal, lignite, and anthracite producing states to total US production. A secondary objective is to estimate a companion demand-side aggregated by region but disaggregated by end-use sector. In its current use, the two sides are operated in tandem, and serve to cross-validate each other by means of tracking market balances. The purposes of this report are to describe the estimation method, results, and performance evaluation criteria that were deemed relevant in assessing the potential predictive performance of SCOAL's statistically fitted relationships and to discuss the pre- and post-estimation considerations that prevailed over the course of mode development. The single equation parameter estimates, associated significance levels, statistical equation performance measures, and general comments regarding SCOAL's supply and demand side equations are presented.

33858 **(DOE/EIA—0394-Vol.3) Model documentation of the Short-Term Coal-Analysis System. Volume 3. SCOAL data documentation.** (JWK International Corp., Annandale, VA (USA)). Apr 1983. Contract AC01-81EI10775. 98p. NTIS, PC A05/MF A01. Order Number DE83012446.

This volume of Short-Term Coal Analysis System (SCOAL) Model Documentation contains the time series data input to each of SCOAL's analysis and projection modules. Each section contains a table of variable mnemonic codes, definitions, sources, and availability. Following the variable definitions table are tables of the data appearing in columnar format with year/quarter labels.

33859 (INIS-mf—7475-Vol.B, pp vp) **Assessing the role of coal in the world energy future.** Hibbard W.R. Jr. (Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Materials Engineering). 1981. NTIS (US Sales Only), PC A18/MF A01. (CONF-8104136—Vol.B).

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

Ten recent extensive studies of long range energy futures were evaluated and a consensus of findings developed. Progress toward the consensus was determined. In the next 20 years the United States will need all of the coal, nuclear, oil shale and tar sands that public consensus and the legislatures will permit. Concerns include the cost and availability of OPEC oil, energy efficiency, acid rain, and carbon dioxide build-up.

33860 **(TENRAC/ADM—80-001) Texas Energy and Natural Resources Advisory Council activities and accomplishments. Annual report.** (Texas Energy and Natural Resources Advisory Council, Austin (USA)). Dec 1980. 91p. NTIS, PC A05/MF A01. Order Number DE83902086.

Portions are illegible in microfiche products.

The activities and accomplishments of the Texas Energy and Natural Resources Advisory Council are summarized in this report. The purpose of the council is to plan for the future energy and natural resources needs of Texas. Discussion is presented under the headings: Energy Policy and Analysis Division; Technology Development Division; Conservation Division; Natural Resources Division; and Fuel Allocation/Emergency Planning Division. (DMC)

2950 Hydrogen And Synthetic Fuels

33861 (SAND—82-2355, pp 43-45) **Future of synthetic fuels: a congressional view.** Krebs, M. (House of Representatives, Washington, DC). Nov 1982. NTIS, PC A25/MF A01. (CONF-820840—).

From 8. underground coal conversion symposium; Keystone, CO, USA (15 Aug 1982).

I think that when faced with a rapidly increasing deficit, a firm commitment to real increases in the defense budget, and an inability on the part of both the Congress and the Executive Branch to deal with the social security program, there must be even further drastic reductions in domestic spending programs. The energy technology programs, and now even the nuclear programs, will not be able to escape. The really unfortunate, frustrating aspect of all this is that under these conditions no rational, goal-oriented program can be planned or managed. All we can hope for is that good research will continue to be done and that the additional time will permit stronger links to be forged between the research community and the private sector. What the country needs, however, is in fact the demonstration program that DOE was never able to give use, and if we are lucky, that's what we will get from the SFC. Our present economic crisis is profound and without doubt, our dependence on imported oil has contributed greatly to the seriousness of our situation. At the same time our domestic energy resources are abundant and they must play an important role in both restoring the economy and preventing any recurrence. But our dependence on imports for the last ten years also threatens our basic political freedoms as well, and it is this, perhaps more than the economy, that is at stake. If the recession bottoms out and growth resumes, we will need more oil and the world's marginal production capacity is still in OPEC's hands. And it was to address this problem that the Synfuels Corporation was created. Not to provide a complete solution, but to make a large part of our domestic energy resources available and to give us knowledge that would restore our posture with respect to OPEC. And then our freedom within this country will not be limited by others, but only by ourselves. (LTN)

2960 Electric Power

REFER ALSO TO CITATION(S) 33023, 33402, 33618, 33619, 33620, 33621, 33622, 33623, 33658, 33812, 33826, 33941, 34403, 34432

33862 **(DOE/NBB—0032-Vol.1) Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C.** (Ransom and Casazza, Inc., Washington, DC (USA); Resource Dynamics Corp., McLean, VA (USA)). 16 Aug 1982. 388p. NTIS, PC A17/MF A01. Order Number DE83011411.

Portions are illegible in microfiche products.

This electric power data requirements review was commissioned in order to determine and describe: the federal government's needs for electric power data; the ability of the utility industry to report data that the federal government needs; the suitability of current data collection systems to gather the needed data; and alternative ways of revising current federal forms so as to collect the needed data. This review involved investigation of the utility industry structure, electric power data users, federal laws and regulations related to data collection, and current data collection systems. As a result of this work it is concluded that: based on estimates of annual reporting burden (person-hours) made by nine investor-owned utilities serving approximately 7.5 million customers, an annual federal reporting cost to each utility's customers was estimated; the burden caused by the EIA is very small in comparison to that produced by the Federal Energy Regulatory Commission, the Securities and Exchange Commission, etc.; the difficulties of the smaller utilities in meeting federal data requirements are significantly greater on a proportional basis than those of the larger utilities; reductions in the federal reporting requirements without accompanying reductions in the state and local reporting requirements would not lead to a sig-

nificant reduction in the total reporting burdens for the electric utilities, because in the majority of cases the states collect even more of the same types of data than the federal government does; there are distinct communication problems among the federal government, data users, and the utilities in both directions concerning the data provided by the utilities; and there are numerous definitional problems and inconsistencies within and across existing data systems.

33863 (DOE/NBB—0032-Vol.2) Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C. (Ransom and Casazza, Inc., Washington, DC (USA); Resource Dynamics Corp., McLean, VA (USA)). 16 Aug 1982. 113p. NTIS, PC A06. Order Number DE83011409.

Paper copy only, copy does not permit microfiche production.

Volume II contains the appendixes to the basic report Review of Electric Power Data Requirements. The following appendixes are included: Elements of Data Framework, Federal Uniform System of Accounts, Legal Mandates for Data Reporting and Use, and Classification of Individual Data Systems According to Data Framework. (RCK)

33864 (DOE/PE/70009—T2) Potential impact of the President's economic recovery plan on the electric-utility industry - with Commonwealth Edison Company serving as a case study. (Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)). Jan 1982. Contract AC01-78PE70009. 118p. NTIS, PC A06/MF A01. Order Number DE83011537.

The objective of this study is to determine whether the President's economic recovery program (ERP) will result in a set of economic conditions which: restores the industry to its former financial health, thus allowing utilities to make investment decisions which are both cost-effective to customers, and beneficial to existing and prospective investors, or leaves the electric utility industry in a financially constrained condition. Thus requiring additional remedies if necessary investments are to be made. These additional remedies might include a restructuring of the rate regulatory process, further reductions in inflation, or a relaxation of environmental, facility licensing and other regulatory proceedings which have significantly increased utility costs. The principal conclusion to be drawn from this study is that the President's economic recovery program (ERP) will not significantly improve the electric utility industry's financial health. Thus the construction of needed generating capacity will continue to be jeopardized. The primary cause for this result is that even under the improved economic conditions associated with the ERP, costs will increase, utilities will be forced to seek increases in their electricity rates, but regulatory commissions-based on historical experience-will not grant increases of sufficient size which both: allow utilities to fully recover cost increased. Result in a significant improvement in the key measures of utility financial health.

33865 (DOE/PE/70041—T2) Comparing the effects of three nuclear power plants on future electricity prices. McWhinney, R.T.; Lee, S.M.; Welsh, W.J.; Collins, A.; Sachs, M. (Resource Planning Associates, Inc., Washington, DC (USA)). Feb 1983. Contract AC01-79PE70041. 64p. NTIS, PC A04/MF A01. Order Number DE83011510.

This paper presents the results of a preliminary analysis of nuclear power economics for three new nuclear stations, and highlights the differences among them that determine their effect on future electricity prices. The nuclear stations selected for analysis are Diablo Canyon (plants No. 1 and No. 2); Shoreham; and River Bend, which is owned by Gulf States Utilities (GSU). The analysis is based on several simplifying assumptions. For example, the two Diablo Canyon units, scheduled to start up in October 1983 (No. 1) and April 1984 (No. 2), are treated as one large plant starting in January 1984. The assumptions for each plant are summarized. The conclusions are explained and the analysis leading to them is described in this report, which is organized into four sections: comparing early impacts on rates; cost effects over 30 years; assumptions and methodology; and summary and qualifications.

33866 (DOE/PE/70472—T1) Power shortages and utility regulation: a discussion of the current policy debate. Final report. (National Conference of State Legislatures, Denver, CO (USA)). 31 Jan 1983. Contract AP01-82PE70472. 45p. NTIS, PC A03/MF A01. Order Number DE83011531.

Portions are illegible in microfiche products.

A discussion is presented on the ability of investor-owned utilities to supply adequate and cost-effective electricity supplies in the 1990s. State utility regulation has been assailed for keeping electricity rates artifically low at the expense of utility stockholders and the adequacy of future power supplies. Critics call for major policy changes to correct what they see as inherent weaknesses in state utility regulation. However, the author points out that the last decade does not indicate a chronic failure of state utility regulation to respond to utility company needs. In the last 3 years state commissions have granted enormous electric rate increases which along with drops in inflation and the completion of construction projects, have thrust utility earnings into the top ranks of major industries. However, projections of large power shortfalls in the 1990's should be taken seriously. The author concludes that the best federal policies for electric utilities will be those that foster a stable and healthy economy.

33867 (DOE/RG/10295—T1) Review of energy-supply-decision issues in the US electric utility industry. (Barry (Theodore) and Associates, Los Angeles, CA (USA)). Sep 1982. Contract AC01-80RG10295. 61p. NTIS, PC A04/MF A01. Order Number DE83011538.

The study reviews the current decision-making issues and attitudes surrounding the electric utility industry and its ability to provide an adequate supply of electric power to meet the expected energy needs in the country for the balance of this century. Many of the study projects, as outlined within the overall effort, were clearly technical in nature. For others, the needed analysis could be drawn readily from existing public information and the official positions of representative industry groups. However, a cornerstone project was defined, requiring direct access to the decision-makers in the industry, with the primary objective of obtaining their candid assessment concerning the energy supply decisions now being made and the potential reality of Capital Aversion. The project contained several other principal objectives, including gaining a direct assessment from these industry leaders as to: current expectations for load growth; the adequacy of current resource plans; the factors that would be used in making decisions on new power generation additions; and what role, if any, the federal government should take in assuring a viable electric energy supply. In addition, a key question raised at the outset of the study was what it would take to get the industry, in general, interested in starting new power plant construction programs. The scope of the project was to include input not only from investor-owned electric utilities but also from representative organizations within the public power sphere, municipal and regional power producers, and a cross-section of state utility regulatory commissions. What is contained in the report, therefore, is a consensus of impressions gained from diverse sources.

33868 (NP—3770047) Energy report of the electrical industry. (Zentralverband der Elektrotechnischen Industrie e.V. (ZVEI), Frankfurt am Main (Germany, F.R.)). Jun 1981. 125p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770047.

Portions are illegible in microfiche products.

The contents of the energy report are the result of an exchange of experience within the electrical industry. Following some remarks on energy supply and an statistical data regarding energy consumption in the Federal Republic of Germany, the trends of energy consumption in the industry, the households and the transportation sector are described and illustrated by some characteristic figures. This gives an idea of energy savings and the possibilities to save energy. The report goes on to suggest adequate measures safeguarding future energy supply by utilizing first of all the saving potential, although this is considered to be of rather limited scope.

33869 (NP—3770055) **Bibliography of the electric power industry of Wuerttemberg.** Zuern, R. (Energie-Versorgung Schwaben A.G., Stuttgart (Germany, F.R.)). 1982. 144p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770055.

The bibliography contains publications from the electric power industry of Wuerttemberg. Publications on and from electric power industry were mainly collected but also descriptions of firms, anniversary publications, historical presentations, etc. In the same way publications and special articles of unions and societies of the power utilities were recorded, as e.g. of the Verband der Elektrizitaetswerke Wuerttemberg-Hohenzollern or of the Studiengesellschaft fuer Hoechstspannungsanlagen (SfH) provided that these unions belong to the area of Wuerttemberg. Moreover, publications of staff members of Wuerttembergian electric power stations were also compiled if they were related to the professional activities of the authors. They deal chiefly with topics from energy industry and electrical engineering, but also from jurisdiction, data processing, pollution protection, etc.

2980 Consumption And Utilization

REFER ALSO TO CITATION(S) 33161, 33352, 33624, 33828, 33842, 33848, 33853, 33892, 33902, 33923, 33924, 33925, 33933

33870 (NP—3770111) **Energistic '81.** (Esso A.G., Hamburg (Germany, F.R.)). 1981. 6p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770111.

Portions are illegible in microfiche products.

A tabular survey (supplemented by some diagrams) of production and consumption of primary energy sources from 1970 to 1981 is given and commented on.

2990 Unconventional Sources And Power Generation

REFER ALSO TO CITATION(S) 33279, 33309, 33313, 33322, 33327, 33338, 33339, 33350, 33352, 33402, 33406, 33543, 33564, 33894, 33935

33871 (CONF-810622—Vol.2, pp 957-959) **United Nations conference on new and renewable sources of energy.** Neuman, L.D. (United Nations, New York, NY). Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

The objective of the United Nations Conference on New and Renewable Sources of Energy was to promote the development and use of new and renewable sources of energy. Principal questions discussed by the Ocean Energy Technical Panel were: what are the technologies which can be utilized significantly in the next 20 years and beyond; what are the major constraints preventing the development of those technologies; and what are the means of overcoming those constraints. Recommendations made to overcome the present constraints are summarized. Policy areas for concerted action are also listed. (LEW)

33872 (CONF-810622—Vol.2, pp 961-962) **US plans for the United Nations conference on new and renewable sources of energy.** Toth, C. (Dept. of State, Washington, DC). Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Broad US goals and specific US objectives for the conference are listed. Emphasis is on improved and expanded international cooperation, education, primacy of national efforts, and efficiency and coordination of existing international institutions rather than the creation of new ones. (LEW)

33873 (CONF-810622—Vol.2, pp 963-967) **Renewable energy resources in the developing countries.** Dosik, R.S.; Hughart, D. (World Bank, Washington, DC). Jun 1981. NTIS, PC A24; S. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Interest of developing countries in the use of renewable energy sources is discussed, and is based on rising oil prices and depletion of forest resources. The advantages and reqirements for the development of renewable energy in developing countries are then given. (LEW)

33874 (CONF-820730—Summ.) **Summary biomass research conference: Southeastern region.** (Tennessee Valley Authority, Muscle Shoals, AL (USA)). Jul 1982. 49p. C. Order Number DE83901782.

From TVA southeast region biomass research conference; Muscle Shoals, AL, USA (12 Jul 1982).

The Tennessee Valley Authority, Auburn University, and the University of Alabama recognized that few individuals working in the biomass area in the Southeast were aware of the breadth of activities underway. Furthermore, potential exists to improve coordination and cooperation thus reducing research costs while enhancing progress. In light of these aspects, a Biomass Research Conference was organized by the three institutions. It was held on July 12-13, 1982, at TVA's National Fertilizer Development Center, Muscle Shoals, Alabama. Representatives from universities and laboratories in southeastern States attended. This booklet contains summaries provided by the speakers of the conference and the conference program. The summaries provide guidance on ongoing research and primary contacts. The booklet also contains the keynote speech delivered by S. David Freeman of TVA's Board of Directors, and a list of participants.

33875 (Juel-Spez—155, pp 215-226) **Some economic aspects of the penetration potential of advanced transformation processes for non-agricultural renewable energy.** Hoffmann, L. Jun 1982. NTIS (US Sales Only), PC A11/MF A01. (CONF-8203124—).

From Meeting of experts on integration of wind power into national electricity supply systems; Juelich, F.R. Germany (8 Mar 1982).

Transformation processes for renewable energy are discussed which are neither traditional (hydro power) nor dependent on agricultural production (biomass) or forestry (fuelwood), such as solar, wind, wave and geothermal energy. The chances of renewable energy to become competitive is crucially dependent on the possibility to lower the unit cost of capital. Market distortions, in particular on the capital markets, lead to a systematic undervaluation of renewable energy transformation process. Projects should therefore be evaluated by using shadow prices and a shadow discount rate. For the market penetration it would be a better strategy to concentrate on smaller wind converter units and get them into operation in sufficiently large numbers. A potential cost advantage of renewable energy results from its low energy flow density which makes it particular suitable for dezentralized application.

33876 (NE-SBT—82-11) **Evalution of the research project 'Forest Energy'.** Hakkila, P.; Kilander, K.; Steinlin, H.S.; Wilhelmsen, G. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jan 1982. 28p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750462.

Portions are illegible in microfiche products.

The purpose of the project was to increase know-how and basic information on how to harvest and use wood for energy. The object of this evaluation is to comment on the results achieved so far as well as existing plans. A comparison to relevant project goals, the scientific level of the work, the integration with related projects etc. are included in the comments.

33877 (NP—3750484) **Energy provision for the Seychelles. Producer gas and other opportunities.** Kristofferson, L.; Kjellstroem, B. (Vetenskapsakademin, Stockholm (Sweden). Beijerinstitutet). Sep 1981. 97p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750484.

Portions are illegible in microfiche products.

This report summarizes the results of a preliminary evaluation of selected energy issues of the Seychelles, based on experiences gained during visits to the Seychelles by the authors in March and August 1981. The problem of energy planning in general for the Seychelles is briefly discussed as well as the prospectives

for selected new energy supply options and energy conversion technologies. Against the background of the outlook on the global oil markets, it is concluded that additional efforts are urgently required for the initiation of adequate energy planning, e.g. collection of basic data. Such data are particularly needed for estimation and projection of the use of biomass fuels in the domestic and industrial sectors, and for estimation of the potentials of other energy options such as coal and renewable sources like biomass, solar, wind and ocean thermal gradients etc. The most promising supply technologies seem to be: - use of forestry and agricultural residues as fuel for producer gas power plants - utilization of solar water heaters - utilization of ocean thermal gradients off Mahe for electric power production using the OTEC-principle. (This option appears interesting in a long term perspective) With proper planning, the first two of these options may give contributions within a five year period. Producer gas problems and opportunities are discussed in great detail, and a programme for testing and evaluation of this technology is outlined. It is suggested that these and other options are studied in more detail by a small semi-informal 'energy task force' based in Government, which should coordinate and supervise energy research and development activities, implement the results of such activities and gradually develop an integrated energy policy for the Republic.

30 DIRECT ENERGY CONVERSION

3001 Mhd Generators

REFER ALSO TO CITATION(S) 32954

33878 **(CONF-7411121—2) Approximations to activity surfaces for slags in potassium-seeded coal flames.** Spencer, F.E. Jr.; Hendrie, J.C. Jr.; Bienstock, D. (Bureau of Mines, Pittsburgh, PA (USA). Energy Research Center). 1974. 14p. NTIS, PC A02/MF A01. Order Number DE83008576.

From NSF-OCR engineering workshop on MHD materials; Cambridge, MA, USA (20 Nov 1974).

Portions are illegible in microfiche products.

Logarithms of approximate activity coefficient surfaces are calculated for K_2O-SiO_2-Al_2O_3 solutions as cubic polynomial functions of two independent composition variables. The polynomials are constrained to satisfy the Gibbs-Duhem equation. Data used include newly prepared tables for kaliophilite, leucite, and microcline liquids, as well as recent potassium pressure measurements made by the National Bureau of Standards. Results are given for equilibrium potassium loss percentages in certain typical coal-fired MHD regimes: 90%, 100%, and 110% simple oxygen ratios; 100%, 50%, 20% and 6% ash carryover; temperatures 2200 (-100) 1500 kelvins. Comparisons are given with the authors' (previous) ideal solution model, as is a discussion of its shortcomings. Seed loss into coal slag has received a justified amount of recent attention within the MHD community. When complete and accurate thermodynamic data become available, it will then become possible to make meaningful computer predictions about this important problem using the methods of this presentation.

33879 **(Juel—1813) Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel.** Blankenhorn, R. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente; Innsbruck Univ. (Austria)). Oct 1982. 93p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750864.

Thesis.

The local stationary subsonic hydrodynamic and electric behaviour is calculated in a section of a Faraday MHD generator. An extended model of the compressible turbulent boundary layer in two dimensions is applied to high temperature gradients. Two transport equations for the turbulent shear stress and the turbulent heat flux are derived. Density fluctuations due to temperature gradients are considered and transformed into temperature fluctuations. The system of five equations for the boundary layer on the cathode- and anode-wall is integrated numerically by the method of characteristics and coupled with the frictionless flow in the core of the channel. The chemical composition of the combustion gas plasma is variable. The material properties are given as a function of pressure and temperature without relaxation.

33880 **Convective and radiative heat transfer in MHD radiant boilers.** Im, K.H.; Ahluwalia, R.K. (Argonne National Lab., IL). *Journal of Energy;* 5: No. 5, 308-314(Sep-Oct 1981).

A combined convection-gas radiation, two-zone flow model is formulated for study of the heat transfer characteristics of MHD radiant boilers. The radiative contributions of carbon dioxide, water vapor, potassium atoms, and slag particles are included in the formulation, and are determined by solving the radiation transport equation using the P_1 approximation. The scattering and absorption cross section of slag particles are calculated from Mie theory. The model is used to analyze the scale-up of heat transfer in radiant boilers with refractory thickness, wall emissivity, and boiler size, under conditions of a gas composition and slag particle spectrum typical of coal-fired MHD combustion. A design procedure is suggested for sizing radiant boilers so as to achieve required heat extraction rate and to provide a flow residence time that is adequate for decomposition of NO/sub x/ to acceptable levels.

3005 Fuel Cells

REFER ALSO TO CITATION(S) 32954, 33784

33881 **(BMFT-FB-T—82-167) Crude gas/air fuel cells with fixed phosphoric acid.** Fleischmann, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 48p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750081.

The development of the Phosphoric Acid Fuel Cell with fixed electrolyte led to the set-up of 5- and 30-45 cell stacks. The feasibility of this construction and the long-term performance have been shown. The specific problems of the larger stacks were evaluated and some possibilities for elimination discussed. The increase of electrode performance was important, but the reproducibility not sufficient. The fabrication process, especially with regard to the incorporation of the electrolyte into the electrode, influenced this performance strongly and gave valuable indications.

33882 **(CONF-830446—4) Advanced fuel-cell concepts for the 0.1- to 100-MW range.** Krumpelt, M.; Ackerman, J.P.; Fee, D.C.; Herceg, J.E.; Slack, C.; Lwin, Y. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01. Order Number DE83011723.

From American Power conference; Chicago, IL, USA (18 Apr 1983).

Three system concepts for molten carbonate fuel cell power plants utilizing natural gas are discussed. One system uses a high temperature reformer, another uses a packed bed reformer process, and the third and most advanced system design is based on an internally reforming molten carbonate fuel cell. Efficiency estimates are given for the systems. (WHK)

33883 **(FCR—3278) 4.8-MW fuel-cell demonstrator. Final report.** (United Technologies Corp., South Windsor, CT (USA). Power Systems Div.). Dec 1981. Contract AC01-76ET13112. 233p. NTIS, PC A11/MF A01. Order Number DE83011436.

Portions are illegible in microfiche products.

The 4.8-MW Demonstrator Program is an outgrowth of a determined effort on the part of private industry to develop the fuel cell into a practical commercial electrical generator. In 1973, after a one-year, $3-million study, United Technologies embarked on a $49-million program to develop a modular 27-megawatt fuel cell power plant, designated the FCG-1, for application to the nation's utility systems as a dispersed generator. From 1975 through 1977 the focus of this program was on construction and test of a one-megawatt fuel cell pilot plant. This unit provided the first demonstration that subsystems could be scaled up to commercial sizes and that substantial power could be generated efficiently by a fuel cell for utility use. The plant was completed in late 1976 and successfully tested in early 1977. The basic building-block elements of the

pilot plant (cells, reformer tubes, power poles, etc), when assembled in greater numbers, would form the basis of larger units, including the 4.8-megawatt dc modules and 9.2-megawatt ac power conditioners which constituted the FCG-1 design at that time. The overall project is described in detail. (WHK)

33884 **(NP—3750467) Studies on iron and cobalt phthalocyanine catalysts for the electrochemical reduction of oxygen with special emphasis on their stability in acid electrolyte.** Johansson, L.Y. (Lund Univ. (Sweden). Institutionen foer Organisk Kemi). Mar 1982. 112p. NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750467.

Thesis.

The catalytic activity of polymeric and cobalt phthalocyanines (FePc, CoPc) for the electrochemical reduction of oxygen in sulphuric acid electrolyte has been investigated. Special attention hes been paid to the study of the causes for the decrease of catalytic activity. Information on polymeric and monomeric FePc complexes has been obtained using Moessbauer spectroscopy. A technique has been developed to obtain Moessbauer spectra of the catalysts (FePc) in situ, i.e. when used as electrodes. Electrochemical and Moessbauer measurements have been performed on electrodes exposed to different heat treatments. The presence of oxidized iron (Fe(III)) in polymeric FePc is seen in the Moessbauer spectra. This iron has a negative influence on the catalytic activity as well as on the stability of the electrodes. The loss of activity is also accompanied by a loss of iron from the complexes. XPS measurements have been performed on electrodes used different lengths of time. Loss of nitrogen from the complexes is found when used in acid electrolytic activity involving some destruction of the ligand, oxidation and loss of iron from the complex is proposed. Thin layer gel filtration with Sephadex gels have been performed to determine the molecular weights of polymeric FePc and CoPc compounds. Activated carbon has been surface modified by oxidation followed by introduction of an imidazol link between the iron in polymeric FePc and the carbon. A decreased rate of deactivation was found during the first 100 hours of operation.

33885 **Zirconia fuel cells and electrolyzers.** Isaacs, H.S. (Brookhaven National Lab., Upton, NY). pp 1-13 of Advances in Ceramics. Volume 3. Science and technology of zirconia. Columbus, OH; American Ceramic Society, Inc. (1981). Contract AC02-76CH00016.

The thermodynamic principals and the development and application of fuel cells and steam electrolyzers using zirconia electrolytes are presented. The effects of overvoltage losses on the efficiencies and factors determining both the physical and electrochemical parameters are discussed. The rate-controlling process for the oxygen electrochemical reaction is considered to be the adsorption or desorption of oxygen on the electrode.

33886 **Characteristics of an NH_3-air fuel cell system for vehicular applications.** Ross, P.N. Jr. (Lawrence Berkeley Lab., CA). pp 726-733 of Proceedings of the 16th intersociety energy conversion engineering conference. Volume 1. New York, NY; American Soceity of Mechanical Engineers (1981). Contract W-7405-ENG-48.

The use of hydrogen air alkaline fuel cell in a consumer vehicle application is examined. Liquid anhydrous ammonia was found to be an excellent storage medium for hydrogen, even though the endothermicity of the NH_3 cracking reaction results in some efficiency penalty. In the system developed here, hydrogen is supplied to fuel cell by the catalytic cracking of liquid anhydrous ammonia, making the total system an indirect NH_3-air fuel cell system. The advantages of the alkaline fuel cell system relative to any acid fuel cell are higher power density (factor of 2-3) and lower cost components (factor of 2) resulting in significantly lower total cost (factor of 4-6). Laboratory scale examinations were made of the ammonia cracking reaction and the power characteristics of an alkaline fuel cell running on cracked ammonia and air. Single cell testing indicated system thermal efficiencies of 34 to 44% (based on H.H.V. of NH_3) can be achieved at power densities of 2600-1000 W/m^2 using currently known electrode technology. In a vehicle application, diesel ICE equivalent performance (30 W/kg) can probably be achieved using only fuel cell power with an estimated fuel cell component cost of less than $2400 (for 50 KW peak power). The primary energy consumption rate (highway cruising) is projected to be only 0.5 kWh/km with natural gas taken as the primary fuel.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

REFER ALSO TO CITATION(S) 33786

3201 Buildings

REFER ALSO TO CITATION(S) 33295, 33313, 33411, 33413, 33417, 33418, 33437, 33443, 33444, 33445, 33446, 33447, 33452, 33453, 33454, 33458, 33467, 33485, 33498, 33518, 33519, 33530, 33534, 33535, 33821, 33936

33887 **(BMFT-FB-T—82-156) Heating of domestic water by waste heat recovery from household refrigerating equipment.** Reil, J.; Kaster, B.; Wegner, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 218p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83750090.

Portions are illegible in microfiche products.

Within the framework of a research contract, the possibility of utilizing waste heat from refrigerators and deep freezers for heating domestic warm water was to be investigated. The most important prerequisite was to establish an efficient cooling and freezing function under all normal operating conditions which are to be expected in the normal household. In order to improve the experimental programme, the second research phase concentrated on a combination of a 370 l deep freezer and a 250 l warm water boiler both of which consisted exclusively of mass produced components. From the tests carried out the following results were established: The function of cooling and also of deep freezing units can be effectively combined with one warm water boiler. The necessary expenditure for the appliance is however only economical with respect to deep freezing units because when using normal domestic refrigerators the amount of heat is too small. The total efficiency evaluation of such a combination is influenced by the environmental temperature, size of the warm water boiler and of the amount and sequence of the domestic water requirements. The economy of the unit could be considerably increased by the development of a mass produced motor-compressor with a sufficiently large oil-cooler to accomplish an optimum thermal insulation of the motor-compressor surface area. The heat transfer of the non-insulated surface area of the present mass-produced motor-compressors is considerable and is decisive for their economy.

33888 **(BMFT-FB-T—83-011) Absorption heat pump for heating small residential buildings.** Birnbreier, H.; Jessinghaus, J.; Sauer, K.L.; Ziegenbein, B. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 131p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750856.

Portions are illegible in microfiche products.

The purpose of this project was the development of a Methanol/Lithium Bromide + Zinc Bromide absorption heat pump for heating one and two family residential buildings. For component design the relevant thermodynamic data of the ternary mixtures with a molar ratio $LiBr/ZnBr_2$ = 2:1 and 4:1 had to be completed. A prototype-unit (heating capacity: 10 kW) was built and tested under all conditions occuring in a real heating system. For application in indirectly fired absorption heat pumps (Generator temperature: <= 100°C) a 4:1 mixture is favoured. Due to an excellent part load behaviour, the seasonal COP is as high as 1.56. The stability of stainless steel and copper in ternary solution mixtures was found to be sufficient.

33889 **(BMFT-FB-T—83-013) Reduction of the energy consumption of an existing building by replacement of the building facade, demonstrated at the office building of EWAG, Nuernberg.** Reinmuth, F. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 142p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750862.

Portions are illegible in microfiche products.

The owner of a 16-storey office building (EWAG, Nuernberg) intends to replace the building facade for reasons of noise protection and reduction of repair costs. Within the above mentioned research program numerous building and installation variants have been calculated using a dynamic heating and cooling load computer program. The optimum facade concerning power and energy consumption, investment and operational costs and room comfort has been proposed. Theoretical calculations are backed up by a measuring program before and after reconstruction. Heating and cooling load calculations with the objective of finding an energetically most effective building facade have been concluded. The measurements of the energy consumption of the existing facade have been executed. The rebuilding of the facade, which will be financed by the owner himself, has not been carried out so far.

33890 **(BNL—32828) Worldwide applications of ground-coupled heat pumps, conventional and solar assisted.** Andrews, J.W.; Metz, P.D. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 30p. (CONF-820834—6). NTIS, PC A03/MF A01. Order Number DE83012074.

From 3. AAPG circum-Pacific Energy and Materials conference (Fractures in geothermal reservoirs); Honolulu, HI, USA (22 Aug 1982).

The use of the ground as a heat source, sink, or storage element in connection with a heat pump is discussed. Both early research and that carried out more recently are surveyed. Cost goals for ground-coupled systems are formulated on the basis of payback, cash flow, and life cycle costing. Design considerations and sizing of in-ground heat exchangers are considered. Some promising systems--both stand-alone systems and systems which use additional solar energy inputs--are described.

33891 **(BNL—51622) Development of a high efficiency warm-air furnace using heat-pipe principles.** (Thermacore, Inc., Leola, PA (USA)). Oct 1982. Contract AC02-76CH00016. 104p. NTIS, PC A06/MF A01. Order Number DE83012270.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A comprehensive product engineering program to develop a high efficiency gas-fired warm-air furnace using heat pipes as its heat exchanger elements is described. A review of heat-pipe operation is included. The work began with a market survey and finished with a followup survey at the program's conclusion. The surveys are discussed. The development of a furnace targeted for the center of the projected market is described. The design phase of the program is discussed as well as the steps taken to develop the components which comprise the delivered high efficiency furnace. Comments are made regarding the work necessary to adapt the prototype heat-pipe furnace to quantity production.

33892 **(DFE—46) Demand of energy by households. Some studies of the determining factors of the demand and of the effects of the allotment by energy taxation.** Dargay, J. (ed.). (Delegationen foer Energiforskning, Stockholm (Sweden)). 9 Feb 1982. 53p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750544.

Portions are illegible in microfiche products.

The use of energy in housekeeping is described and the influence of prices, income and other factors upon this use is analysed. It is shown to decrease per expended krona with increased income. Retired persons also use more energy than others. In 1978 the enrgy cost was c:a 11 per cent of the consumption of an average household. The increase of the share of energy cost of the total housekeeping has affected low-income households and households in sparsely populated areas. Various factors influencing the consumption of gasoline have been investigated. The price sensitivity has been studied in econometrics. It was found to be more sensitive to motor fuels in the long run than for the energy used for dwellings. The effect of energy taxation on the distribution of net income is elucidated. The present system hits thinly populated areas, living in one-family houses and households in northern Sweden.

33893 **(LBL—14026) Simulation of HVAC equipment in the DOE-2 program.** Hirsch, J.J. (Lawrence Berkeley Lab., CA (USA)). Dec 1982. Contract AC03-76SF00098. 21p. (CONF-821238—1). NTIS, PC A02/MF A01. Order Number DE83011560.

From International conference on systems simulation in buildings; Liege, Belgium (6 Dec 1982).

General considerations and models used by the DOE-2 program for the simulation of residential and commercial HVAC equipment are discussed. The use of transfer functions and linear controller models allows strong coupling between the envelope and the equipment models while the simulation of envelope and equipment configurations is performed sequentially, resulting in significantly reduced computation time. Empirical formulations of equipment models allow fast calculations without sacrificing sensitivity to primary physical parameters. A semi-iterative (up to three iterations) approach can produce accurate simulations of interacting control systems without a significant increase in computation time.

33894 **(LBL—14790) Roof apertures in office buildings.** Place, W.; Fontoynont, M.; Conner, C.; Kammerud, R.C.; Anderson, B.; Bauman, F.; Carroll, W.; Howard, T.C.; Mertol, A.; Webster, T. (Lawrence Berkeley Lab., CA (USA)). Jan 1983. Contract AC03-76SF00098. 16p. (CONF-830229—1). NTIS, PC A02/MF A01. Order Number DE83011681.

From International daylighting conference; Phoenix, AZ, USA (16 Feb 1983).

An investigation has been made of potential lighting electricity reductions and associated thermal impacts of replacing electric light with sunlight admitted through rooftop glazing on a single-story, prototypical office building. Experimental scale models have been used to determine the fraction of the solar radiation entering the aperture which reaches the work plane as useful illumination. This information is used in a developmental version of the building energy analysis computer program BLAST-3.0 to predict reductions in lighting electricity and the impacts on energy consumption for heating and cooling the building. The results indicate that a large fraction of the electricity consumed for lighting a single-story office building can be displaced using modest amounts of glazing in the roof. Also, both heating and cooling energy consumption reductions are possible from a daylighting system, but they are substantially smaller than the potential lighting electricity reductions. The design implications of the results are discussed and future directions for the work are outlined.

33895 **(LBL—15907) Ventilation by stratification and displacement.** Skaaret, E. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 12p. (CONF-830520—4). NTIS, PC A02/MF A01. Order Number DE83012443.

From 2. international congress on building energy management; Ames, IA, USA (31 May 1983).

Portions are illegible in microfiche products.

Ventilation effectiveness is not one single index which can be used for classifying ventilating systems. It is shown that a system has different effectivenesses depending on the characteristics of the pollution sources. A transient ventilation effectiveness can be used to generally characterize the system behavior during transient conditions. This index is, for a given system, dependent only on the thermal conditions. Using the different concepts of ventilation effectiveness and knowledge of the nature of the diffusion process it is concluded that the mixing principle in ventilation is not the best one. The displacement principle working vertical-up (air supply directly to the zone of occupation) is generally working much better. Density stratification improves the efficiency. Conditions for stable thermal stratification is dealt with. Room heating systems are concluded to be based on the radiant heating principle. A no recirculating displacement solution using a heat exchanger is claimed to be energy efficient. Research work which substantiated the different conclusions is referenced.

33896 **(NP—3750540) Small houses in rocks. Preliminary study.** Stephansson, O.; Elfgren, L.; Faxwall, S. (Hoegskolan i Luleaa (Sweden). Adv. foer Bergmekanik). [nd]. 127p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750540.

Portions are illegible in microfiche products.

A new method for the accumulation of heat is presented. Air is circulated in the space between the rock and the building and acts both as a transporting medium for heat and for the ventilation of radon. The use of low-grade energy sources is favoured because of a very low consumption. Heat pumps can be combined with drilled wells. Small houses in the rock also imply an efficient exploitation of the ground in mountainous regions. This preproject discusses new principles of building construction.

33897 **(NP—3770049) Simple method for evaluation of the maximum thermal residual stresses in multi-layer external structural members.** Zumbroich, H. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bauwesen). 27 Jun 1980. 155p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770049.

Portions are illegible in microfiche products; Thesis.

The aim of the paper is to study the stresses of external structural members at unfavourable nonsteady temperature distributions in order to give indications from this point of view concerning an appropriate constructional design. This is why a mathematical method for maximum thermal residual stresses must be established including and combining the following separate calculations: a) fixing of the most unfavorable thermal load, i.e. for practical application: establishing a 'temperature load model', b) nonsteady temperature evaluation in single- and multi-layer structural members, c) stress evaluation as a function of the calculated temperature distributions, d) determination of the maximum stress. Apart from establishing the mathematical method it is intended to achieve by means of simple assessing criteria an approximate evaluation of the temperature distribution to be expected and, resulting from it, the basis for the stress evaluation in order to be able to assess a structure also without an exact calculation. When the temperature distribution is determined the influence of the mechanical material parameters on the stresses expected in usual structures will have to be interpreted more exactly. Besides the meteorological influences also the temporal effect of a fire with respect to the increase of temperature and stress in the structural element will be briefly discussed.

33898 **(NP—3770089) Energy concepts for office buildings.** (Vereinigung Schweizerischer Beratender Ingenieur- und Architektur-Gesellschaften (USSI), Zurich). [nd]. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770089.

Developments in the world energy situation have forced planners of office and administrative buildings to seek energy-conscious solutions. Not just the design of the building but rather the development of comprehensive energy concepts have come to the fore and must be taken into account when planning office buildings as important factors in ensuring and controlling energy supplies. A joint effort by several consulting engineering and architectural firms of USSI, the present study is intended to give food for thought and demonstrate a number of novel approaches for the energy concept of the future in office buildings.

33899 **(NP—3770091) Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2.** Pittner, H. (Bundesministerium fuer Bauten und Technik, Vienna (Austria). Sektion 4 - Technisches Versuchwesen). Mar 1982. 29p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770091.

Portions are illegible in microfiche products.

This ordinance establishes the test method for the determination of the thermal conductivity of materials or the thermal resistivity of stacked or laminated material with the plate apparatus. Further processing of the measured values of thermal conductivity or thermal resistivity for application on the building sector is discussed. The plate apparatus is suitable for the inspection of plane plate-shaped samples out of: homogeneous material; materials which are close to being homogeneous, for ex. porous, fibrous or granular material; material stacked vertically to the heat flow; profiled plates but only if the hollow spaces created by profiling are covered during application in practice. The plate apparatus is not suitable for inhomogeneous samples, for ex. masonry. This testing method is generally applicable for materials with a thermal conductivity below 2 W/(m.K.). In the 2sup(nd) part it is shown how the values of thermal conductivity determined in part 1 can be used to find mathematical values destined for application in the building industry.

33900 **(ORNL/CON—114) Heat-pump desuperheaters for supplying domestic hot water - estimation of energy savings and economic viability for residential applications.** Olszewski, M.; Fontana, E.C. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 33p. NTIS, PC A03/MF A01. Order Number DE83012372.

The heat reclaimer is a double-wall heat exchange system that removes superheat from the heat pump (or central air conditioning) cycle and uses it to heat water for domestic uses. During summer operation, this heat would normally be rejected to the atmosphere without being used. Thus, water heating is accomplished using essentially no primary fuel. In winter, the heat extracted from the cycle would have been used for space heating. However, energy savings are possible above the heat pump balance point because water heating is performed at an enhanced efficiency. Potential energy savings and economic viability of the heat reclaimer were determined for 28 sites throughout the United States. These results indicate that the heat reclaimer is not economically attractive compared with gas- or oil-fired water heating systems. However, it is competitive with electric resistance water heaters. Based on these results, a calculational scheme has been developed that could be integrated into the model audit procedure.

33901 **(ORNL/CON—122) Buildings energy research: a bibliography. Publications of the Building Systems Division.** Jordan, A.C. (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 259p. NTIS, PC A12/MF A01. Order Number DE83012298.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Buildings and building materials account for over one-third of the energy consumed in the United Stated today. The Department of Energy's Building Systems Division (formerly the Buildings Division) has sponsored a variety of research programs designed to improve the energy performance of both new and existing buildings. This bibliography lists most of the documents generated from that research. Additional documents not sponsored directly by the Building Systems Division but bearing close relationships to its programs are also listed. The bibliography was created from a computerized bibliographic data base managed by the Oak Ridge National Laboratory's Center for Energy and Environmental Information, a part of the Information Division's Information Center complex. Abstracts and keywords are included for most of the documents.

33902 **(PNL—4717) Impact of conservation measures on Pacific Northwest residential energy consumption. Final report.** Moe, R.J.; Owzarski, S.L.; Streit, L.P. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 91p. NTIS, PC A05/MF A01. Order Number DE83012522.

The objective of this study was to estimate the relationship between residential space conditioning energy use and building conservation programs in the Pacific Northwest. The study was divided into two primary tasks. In the first, the thermal relationship between space conditioning energy consumption under controlled conditions and the physical characteristics of the residence was estimated. In this task, behavioral characteristics such as occupant schedules and thermostat settings were controlled in order to isolate the physical relationships. In the second task, work from the first task was used to calculate the thermal efficiency of a residence's shell. Thermal efficiency was defined as the ability of a shell to prevent escapement of heat generated within a building. The relationship between actual space conditioning energy consumption and the shell thermal efficiency was then estimated. Sepa-

rate thermal equations for mobile homes, single-family residences, and multi-family residences are presented. Estimates of the relationship between winter electricity consumption for heating and the building's thermal shell efficiency are presented for each of the three building categories.

33903 **(SOL—1982-6) Sala 3.2 MW waste water heat pump measurements. Operation experiences. Report 1.** Nylander, P.I. (Swedish State Power Board, Vaellingby). Mar 1982. 11p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750532.

Operation experiences and economic out come of the first six months of operation are reported. An operation availability around 80 per cent was reached, and it is expected to rise to 90 per cent in the future. Around 1100 cubic meters of fuel oil was saved during the first six months of operation.

33904 **(SV-SOL—1982-3) Heat pump for waste water in Sala, Sweden.** (Swedish State Power Board, Vaellingby). Jan 1982. 13p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750535.

Portions are illegible in microfiche products.

A technical description of the 3.2 MW heat pump is given. The economy is discussed.

33905 **(SV-SOL—1982-4) Heat pump for waste water in Sundsvall, (Sweden).** (Swedish State Power Board, Vaellingby). Mar 1982. 9p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750534.

A technical description of the 220 kW heat pump is given. Operation experiences are reported and the economy is evaluated.

33906 **Reducing edge losses in multilayer curtain type window shutters.** Schoenau, G.J.; Besant, R.W. (Univ. of Saskatchewan, Saskatoon). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 146-148(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

One limiting factor in achieving optimum thermal peformance in shutters is air leakage around the shutter edges. A motor driven shutter using multilayer curtains employing a magnetic type edge seal is described. Using a controlled environment chamber the thermal performance of some shutters of this type was measured. Two layer and four layer shutters were tested and found to have thermal resistances of 0.81 m^2-°C/W and 1.22 m^2-C/W respectively. The two layer shutter performed as well as a similarly sized unit in which the layers were permanently sealed. Although adequate, the four layer unit did not perform as well as expected, likely because of air leakage between cells at the top of the shutter.

33907 **Design of a moderate-cost microcomputer data acquisition system for experimental investigations of thermal systems.** Garbini, J.L.; Emery, A.F.; Heerwagen, D.R.; Kippenhan, C.J.; Downs, R.A.; Johnson, B.R. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 195-199(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Experimental investigations of thermal systems typically require continuous or periodic monitoring of a relatively large number of analog sensors. Examined are the design criteria and instrumentation requirements for data acquisition systems intended for long-term monitoring of the transient thermal response characteristics of buildings. A microcomputer based system of moderate cost, high flexibility, capable of expansion, and requiring no custom-built components is described.

33908 **Optimum conservation for northeast homes.** Palmiter, L. (Ecotope Group, Seattle, WA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 223-227(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Presented is an easy-to-use method for finding the optimum thermal conductance, or heat loss rate, of homes in Seattle, whose climate is representative of most of western Oregon and Washington. The method is given in both graphical form and in an analytic form suitable for use with a pocket calculator. The paper also shows how to balance the conservation investments for each building element so that all elements are equally cost-effective. Recent conservation costs for the Pacific Northwest are used to optimize a typical 1500 square foot home. A twenty year life-cycle cost analysis assuming electric heat at $.02 and $.04 per kilowatt hour results in optimum homes with R-19 to R-25 walls, R-35, to R-47 roof and floor, double to triple glazing, and tight construction with an air-to air heat exchanger. Extra conservation costs over a home meeting ASHRAE Standard 90 to 75 are $2200 to $3500. Fuel consumption is reduced by 75 to 90 per cent. Passive solar contributions are shown to have little economic effect.

33909 **Use of cost-effectiveness and comfort bases for selecting from among alternative envelope design strategies for a high-rise office building.** Emery, A.F.; Heerwagen, D.R.; Johnson, B.R.; Kippenhan, C.J. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 256-260(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A continuing study of the thermal performance of a prototypical urban high-rise office building is reported. A series of alternative envelope compositions is evaluated in terms of occupant thermal comfort and benefit-cost issues. The thermal behavior of a perimeter single-person office with these envelopes is simulated using the computer program UWENSOL. Envelope variables included in the study are: percentage of glazing, types of glazing and glazing assemblies, and the mass and resistance of the opaque envelope. Annual energy consumptions are derived and, using a savings-to-investment ratio, the economic desirabilities of the various compositions are determined. Also, by employing the computer routine COMFORT which is based on the Fanger Comfort Equation, the extents of likely occupant comfort for the several envelopes are predicted.

33910 **Study of air infiltration in tight homes.** Lints, M.C. (RIT Research Corp., Rochester, NW); Rizzuto, J.E.; Desmond, R.M. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 441-445(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The results are presented of the first phase of a study to measure infiltration and indoor air quality in a number of homes in Rochester, New York. The objectives of the overall study were to: (1) assess the effectiveness of special construction techniques and determine the energy savings that result; (2) monitor indoor air quality in selected homes with low infiltration; and (3) evaluate the thermal performance and impact on indoor air quality of mechanical ventilation systems employing air-to-air heat exchangers. In the first phase of the study a sample of 50 homes, with and without builder-designed tightening measures, was selected for field testing. The effective leakage area was measured in each house using the fan pressurization technique. Specific leaks were located with the aid of smoke sticks. In the second phase, ten relatively tight homes were chosen for detailed study of indoor air quality. Air-to-air heat exchangers were installed in these homes, and air quality monitoring was performed with and without their use. In each of these homes the air exchange rate, radon concentration, and various temperatures were measured. Other equipment provided data on the average daily formaldehyde concentration, the average weekly nitorgen dioxide concentration, humidity levels and heating energy consumption. This paper presents the results of the effective leakage area measurement, and describes the most significant location of air infiltration within the sample of homes.

33911 **Road map to the stars: teaching an integrated approach to energy conserving design.** Lakin, J.E.; Millet, M.S. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 498-502(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

An understanding of the trade-offs between building interior illumination strategies, daylight and/or artifical, and heating and cooling requirements has received an increasing amount of attention. Architects have begun to rekindle an interest in articulating a

delicate balance of the simultaneous visual and thermal effects of the sun's rays. The tradition of teaching architecture students about these subjects has accurately reflected the architectural professions abdication of interest and influence to specialist consultants and engineers. As architects reassert their design influence, so is architectural education responding with like concerns. Building on two premises: information must be transfered both experientially and didactically for the greatest amount of longterm learning to occur; the integrated quality of sunlight/daylight, heat and light, should be experienced simultaneously to best transfer students' design awareness of the experience of light; an integrated luminous and thermal approach to energy conserving design has been organized. The approach is documented through one student's work in one of several teaching formats, graduate architecture studio, that have been offered.

33912 **Development of a daylighting resourcebook and curriculum at Rensselaer Polytechnic Institute's School of Architecture.** Bryan, H.J.; Kroner, W.M.; Leslie, R.P. (Rensselaer Polytechnic Inst., Troy, NY). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 508-510(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

In 1979 the U.S. Department of Energy initiated a Passive Building Climatology Curriculum Development Program for Schools of Architecture. As a result of this program, which was administered by the University of Pennsylvania, Rensselaer Polytechnic Institute developed a document entitled: Daylighting: A Resourcebook. The Resourcebook has undergone testing and evaluation involving students, faculty, and professionals involved with architectural education. This paper presents the Resourcebook in terms of its objectives, contents, and current and potential applications; it also describes the daylighting curriculum developments currently in process at RPI's School of Architecture as a result of this research.

33913 **Energy conservation and solar retrofit analysis of a large office building.** Arasteh, D.; Hepner, M. (R. G. Vanderweil Engineers, Inc., Boston, MA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 602-606(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

During the winter and spring of 1981, a technical energy conservation and solar analysis of the JFK Federal Office Building in Boston was conducted. To reduce the building's energy consumption of a total of nineteen Energy Conservation Measures (ECM's) were analyzed. Among the measures studied were: reduction of ventilation and supply air, central automation controls, programmable lighting, absorption chiller replacement, fenestration modification and heat recovery. The results of the analyse show that implementation of all recommended ECM's would reduce energy consumption by 50% from a raw source Annual Energy Index (AEI) of 33.9 x 10^8 J/m^2 (299 MBtu/sf) to 17.2 10^8 j/m^2 (152 MBtu/sf). This relates to a savings of approximately $950,000 annually at April 1981 energy costs for a total construction cost of three million dollars.

33914 **Heat mirror coatings for internal load dominated buildings.** Rosen, J. (South Mountain Design, Cambridge, MA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 626-630(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Heat mirror coatings can improve the thermal performance of window systems by suppressing radiation heat transfer and selectively transmitting solar energy. This paper discusses the ideal properties of a heat mirror coating developed for internal load dominated buildings. It shows how high visible transmission can be maintained while minimizing solar heat gain. Measured data from a heat mirror film with these characteristics are presented along with heat transfer coefficients, shading coefficients and transmission properties for a variety of glazing options.

33915 **Art of daylighting.** Peters, R.C. (Peters Clayberg and Caulfield Architects, San Francisco, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 651-652(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

This narrative is an introduction to a slide presentation on dalylighting design. The major emphasis is to examine the use of light in buildings and spaces with a primary focus on daylighting which enhances human activity.

33916 **Prototype biosphere: adobe habitat.** Merdler, S. (Stephen Merdler Associates, Santa Fe, NM). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 722-725(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The emerging awareness of residential design values focusing on the local environment, resource recycling, energy efficiency and self sustaining attributes is explored. A site-specific example where many of these values are considered is presented.

33917 **Rammed earth construction: a re-emerging technology.** Schrader, C.A. (Rockwell International, Canoga Park, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 738-741(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Rising energy and construction costs emphasize the need to develop low cost, energy efficient alternatives to conventional construction techniques. One such alternative which is generating renewed interest, after remaining relatively neglected for almost 50 years, is rammed earth construction. In response to this renewed interest, the Energy Technology Engineering Center (ETEC) has conducted an extensive literature search on the subject of rammed earth. The information has been compiled herein to (1) provide a general understanding of rammed earth as a building method, (2) present an overview of the state-of-the-art of rammed earth construction, and (3) identify areas of study that should be undertaken to determine the practicality of rammed earth as a modern day construction technique.

33918 **Earth coupled cooling techniques.** Grondzik, W.T.; Boyer, L.L.; Johnston, T.L. (Oklahoma State Univ., Stillwater, OK). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 837-841(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Earth coupled cooling is an important consideration for residential and commercial designers, owners, and builders in many regions of the country. The potential benefits which can be expected from passive earth contact cooling are reviewed. Recommendations for the design of earth sheltered structures incorporating earth coupled cooling strategies are also presented.

33919 **Rainy day shading: the effect of shading devices on daylighting and thermal performance.** Millet, M.S.; Lakin, J.E.; Moore, J. (Univ. of Washington, Seattle). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 845-849(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The trade-off between daylight admittance into buildings and heat loss or gain through the glazing is receiving increased attention from architects and engineers as an ever more delicate balance is sought in minimizing energy use in building construction and operation. Initial findings are presented of a study that addresses the design of shading devices for both thermal control and daylight rendition, showing that devices which block direct solar radiation equally do not admit visible light equally.

33920 **Use of physical scale model for daylighting analysis.** Bryan, H.; Lohr, A.; Mathis, R.C.; Rosen, J. (Massachusetts Inst. of Tech., Cambridge). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 865-869(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

A process is described for determining the quantitative and qualitative features of a proposed daylighting design using physical scale models. Several issues (i.e., modeling techniques, testing, measurement, visual analysis and photography) are discussed that must be resolved before physical scale modeling can be undertaken. Finally, a physical scale modeling case study is presented which illus-

trates many of the issues outlined as well as a photographic sequence of the physical scale modeling process.

33921 **Commercial office daylighting demonstration.** Pike, T.F. (Tishman Research Corp., New York, NW); Rizzuto, J. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 870-874(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The results of a commerical office photoelectrically controlled, dimmable lighting demonstration in New York City have shown that daylighting can be used to conserve energy and limit peak electrical demand. In this demonstration, three photo-electrically controlled dimming systems were compared side-by-side to test the concept of independent dimming of banks of luminaires controlled with individual photocells.

33922 **Substitution of daylighting for electric lighting in a large office building.** Windheim, L.S.; Davy, K.V. (Leo A. Daly Company, San Francisco, CA). *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 875-879(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

Analysis of the energy use of large office buildings reveals the dominance of lighting as the major energy use category, requiring up to 60% of the total energy consumed by a building in a mild climate like California's. With the application of passive solar design strategies to this type of building, the importance of daylighting as a means of reducing its annual energy use is underscored. An energy sensitive design process is applied to a large (600,000 sq. ft.) engineering office building located in the San Francisco Bay Area of California. The use of daylight as a substitute for electric lighting was identified as a strategy for increasing the energy efficiency of the building as well as improving the visual qualities of the work environment. Results of a model/simulation testing program indicate that the proposed design can contribute up to 75% of the ambient lighting in the work area. To enhance the visual satisfaction of the workers, a task-ambient lighting concept combining daylighting, indirect fluorescent lighting, and individual task lights at work stations will be deployed.

3202 Transportation

33923 **(ANL/ES—130) Technology assessment of productive conservation in urban transportation. Final report.** LaBelle, S.J.; Moses, D.O. (Argonne National Lab., IL (USA)). Nov 1982. Contract W-31-109-ENG-38. 492p. NTIS, PC A21/MF A01. Order Number DE83012179.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Two strategies for the productive conservation of energy in urban transportation were compared to a reference situation in three typical cities in two plausible socio-economic scenarios; the reference case assumed as extension of transportation policies in place in 1980. Travel patterns, revenues and costs, and vehicle purchases were forecast; the resulting impacts on the physical environment, use of energy and materials, the economy, and health and safety were examined. The Group Travel Strategy, which included substantial additions to transit service, transit fare reductions, and gasoline and parking tax increases, yielded slightly higher energy savings than did the Individual Travel Strategy. The latter strategy raised average new car fuel economy steadily until the year 2000 and changed nothing else relative to the In-Place Policy. By 2000, assuming steady fuel price increases, the projected savings in total energy use under both strategies exceeded the savings projected under the In-Place Policy, where total energy use declined 16 to 34% from 1980 levels. The nature of the energy used for urban transportation changed significantly by 2000. In all situations, indirect energy use rose to about 40% of the total from the 1980 value of 24%. The environmental impacts varied by strategy, with Group Travel Strategy impacts in general more benign.

33924 **(CONF-830131—2) Evaluation of options for freight carriers during a fuel crisis.** Johnson, L.R.; Saricks, C.L. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 29p. NTIS, PC A03/MF A01. Order Number DE83011747.

From Transportation Research Board annual meeting; Washington, DC, USA (17 Jan 1983).

Demand-reduction alternatives that carriers (truck, rail, air, inland waterway) could logically adopt during a fuel emergency are examined and the fuel savings attributable to their use are quantified. Areas for improvement in fuel efficiency may be classified as systemwide (increasing load factors, reducing congestion) or vehicle/operation-specific (adapting available technologies, improving maintenance, changing operating practices). However, fixed and variable non-fuel costs could increase such that, for a given alternative (e.g., phased advance technology retrofit) the payback period could exceed the duration of any shortfall, and the investment thus could not be justified on the basis of the shortfall alone. Specific alternatives under each of the five general areas listed above are considered for each mode and a percentage reduction in fuel consumption estimated, based on reported effectiveness and the expected degree to which such measures would be adopted systemwide. An aggregate estimate of petroleum savings (roughly 4 to 8%) was found to be attributable to demand reduction alternatives that could be adopted by freight carriers without drastically curtailing service. As carriers move toward improved fuel efficiency as an integral aspect of normal operations, the potential for reducing fuel demand will decline in the future.

33925 **(DOE/CS/24448—T2) Vanpooling for profit: a business opportunity.** Schuck, L.; Welch, B. (Alliance to Save Energy, Washington, DC (USA)). Aug 1982. Contract FG01-80CS24448. 55p. NTIS, PC A04/MF A01. Order Number DE83012276.

Questions to ask and calculations to make to judge whether a vanpool is a practical business are detailed. The need for the service and the regulatory barriers are discussed. Financial calculations involving business and tax planning include calculating the cash flow for each year of the operation. (MHR)

33926 **(N—8231499) Spectroscopic investigations of a field emission generated radiative zone: Mass spectroscopic measurements. Final Report.** Mitterauer, J. (Technische Univ., Vienna (Austria)). Oct 1981. 106p. (ESA-CR(P)—1589). NTIS, PC A06/MF A01.

In view of the application of liquid metal field ion sources as electric thrustors for space propulsion, the basic physical features of the field ionization mechanism were analyzed experimentally. An ultrahigh vacuum test chamber and a liquid metal ion source were built. Diagnostic methods, e.g., basic measurements of the emission characteristics, probe measurements of the ion current distribution, mass spectroscopic measurements of the particles emitted from the ion source, and spectroscopic measurements of the visible radiation accompanying field ionization, were developed. Experimental data which can be transferred to prototype field ion thrusters are presented, but experimental facilities limit conclusions regarding theoretical aspects of field ionization.

33927 **(NP—3770090) Between riding and flying.** (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). May 1982. 24p. Bundesministerium fuer Forschung und Technologie, Bonn, Germany, F.R.

Competitive basic development activities concentrated on the electromagnetic rail rapid transit system TRANSRAPID in 1977. This new system offers several special advantages such as minimum wear due to contactless suspension, guidance and propulsion systems, low noise levels and flexible integration into existing infrastructures. Favourable investment and operating costs are anticipated. The results obtained so far are encouraging and can easily bear international comparison. It is the aim of these development activities to open up the possibility of further strengthening the railways as a transport system in our own country and for export purposes in the medium and long term.

33928 **(VTT-TIED—102) Energy research in the mechanical forest industry 1980-1982. Energy consumption in product transport.** Hackman, J.; Kivimaeki, J. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). May 1982. 38p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).

The energy consumption in the transportation of mechanical forest industry products in the inland traffic network was about 1.01 million GJ in 1979. This amounts to 28.2 million litres in diesel fuel and is about 2.5% of the energy consumption in all goods transportation. The monetary value of the consumption was about 61 million FIM using the prices at 1.4.1981. 6.90 million tons were transported and the transportation mileage was 1.16 thousand million ton kilometres. In the sea transports the consumption was 3.79 million GJ. In the transports under study the average energy efficiency was in road traffic 0.75 tkm/MJ and in rail traffic 2.96 tkm/MJ. In the inland transports the energy efficiency was 0.72 tkm/MJ and in export transports in the inland traffic network 2.11 tkm/MJ. The proportion of the consumption in the road traffic was 795 000 GJ and in the rail traffic 211 800 GJ. Of the product groups the proportion of the sawn goods was the largest, 433 700 GJ, which is 43% of the energy consumption in the transpors under study. The volume of transports was distributed between road and rail traffic in a relation of 69/31. The transportation mileage was distributed in a realtion of 44/56, and the total energy consumption in relation of 79/21. The averg transport distance was in road traffic 109 km and in rail traffic 311 km. The moe processed a product is, the larger is the proportion of road traffic in the transports. The proportion of the road raffic is larger in inland transports. The than in export traffic. Energy could be saved by decreasing driving without load, developing transportaion equipment and increasing the proportion of rail transport and the now insignificant waterway transport.

33029 **Urban mass transportation abstracts.** *Urban Mass Transportation Abstracts;* vp(May-Jun 1981).

The abstracts compiled cover the following topics: conventional transportation services, energy and environment, financing, land use, non-urban and low-density area transportation, paratransit systems and services, planning, policy, and program development, political processes and legal affairs, safety/product qualification and security, socioeconomics, technology development and deployment, transportation of disadvantaged/special-user groups, transportation/transit management, and transportation productivity and efficiency. Each citation gives the report title, personal and corporate authors, source of funding from the Urban Mass Transportation Administration (UMTA), date of publication, and the NTIS order number and price code. (LEW)

3203 Industry And Agriculture

REFER ALSO TO CITATION(S) 33012, 33043, 33052, 33055, 33059, 33340, 33352, 33821, 33826, 33944

33030 **(BMFT-FB-HA—82-019) Stress reduction at the production of bottle-cap screws.** Schach, V.; Schach, H.; Haeufgloeckner, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 82p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750079.

To seal contents gastight on a large scale aluminium cap screws are produced on production lines where in a full extent stress at the operating positions is a fact harmful vapors, heat and other factors injurious to health. Only with new engineering the plurality of single stress factors largely could be eliminated. During isolated series of experiments 28 (twenty eight) working operations necessary for the production of cap screws have been brought to a new method of production. As a result we could design, draw, construct and build up the prototype of a plant where the main stress factors (harmful vapors, heat expansion) could be eliminated by 100%. Through reorganization and sequent working operations of the processing station the monotone and physical stress has been minimized. A subsidiary result is an energy saving of max. 75%. Mainly this factor and the economic and hygienic production of cap screws should help the marketing introduction of the plant.

33031 **(BMFT-FB-T—82-151-Vol.1) Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 1.** Poettken, H.G.; Strohschein, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 488p. (In German). NTIS (US Sales Only), PC A21/MF A01. Order Number DE83750094.

The present energy supply situation requires increasing efforts towards the conservation of energy. The utilization of waste heat to substitute primary energy is an essential factor to complement the savings of primary energy achieved by changes in the design of industrial plant and processes. In this study the potentialities of utilizing waste energy in an integrated iron and steel works were investigated in technical and economic terms. It was found that possibilities for utilizing such energy always obtain when waste energy is produced fairly continuously at an appreciable temperature level and in adequate quantity. Economic analysis has shown that with present-day energy prices it is in many cases only a question of time before the recovery of waste energy, which is already technically feasible today, becomes an economic proposition. However, micro- and macro-economic aspects cannot always be regarded as equally important. The increasing use of waste energy in the steel industry or elsewhere is no alternative to the expansion of other energy-producing facilities.

33032 **(BMFT-FB-T—82-151-Vol.2) Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 2.** Poettken, H.G.; Strohschein, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 116p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750093.

The present energy supply situation requires increasing efforts towards the conservation of energy. The utilization of waste heat to substitute primary energy is an essential factor to complement the savings of primary energy achieved by changes in the design of industrial plant and processes. In this study the potentialities of utilizing waste energy in an integrated iron and steel works were investigated in technical and economic terms. It was found that possibilities for utilizing such energy always obtain when waste energy is produced fairly continuously at an appreciable temperature level and in adequate quantity. Economic analysis has shown that with present-day energy prices it is in many cases only a question of time before the recovery of waste energy, which is already technically feasible today, becomes an economic proposition. However, micro- and macro-economic aspects cannot always be regarded as equally important. The increasing use of waste energy in the steel industry or elsewhere is no alternative to the expansion of other energy-producing facilities.

33033 **(DOE/CS/54277—T1) Technical and economic feasibility of electric tractors in US agriculture.** Gesell, P. (comp.). (Georgia Univ., Athens (USA); Iowa State Univ. of Science and Technology, Ames (USA); Rutgers--the State Univ., New Brunswick, NJ (USA); South Dakota State Univ., Brookings (USA); Virginia Polytechnic Inst., Blacksburg (USA); Virginia State Coll., Petersburg (USA)). [nd]. Contract AI01-78CS54277. 186p. NTIS, PC A09/MF A01. Order Number DE83011582.

Portions are illegible in microfiche products.

The current energy use patterns on selected farms were identified. Models of electric-powered vehicles for both the near term and long term were specified. Five possible scenarios of price increases, net of inflation, for various power sources as well as fertilizers and pesticides were projected. The impacts of electric vehicles on different US farms in 1980 under the specified technical and current economic conditions were assessed. The impacts of electric vehicles on US farms were projected under various economic scenarios for 1990. (MHR)

33934 **(DOE/ET/15350—2) Development of the biphase turbine for waste-heat conservation. Final report.** Studhalter, W.R. (Biphase Energy Systems, Santa Monica, CA (USA)). Apr 1982. Contract AC07-76ET15350. 270p. NTIS, PC A12/MF A01. Order Number DE83012209.

A Biphase turbine for generation of power from waste heat was designed and tested. The turbine generated a maximum of 168 Hp using a high pressure water/steam mixture as the working fluid. In an actual waste heat application, the hot water would be generated in an exhaust gas heat exchanger. The measured power at the design point, 138 Hp, was 90% of the design goal. Improvements were identified which should enable the turbine to reach the design efficiency, 45%. On the basis of the test results and economic studies, the Biphase turbine appears to have a significant market in waste heat recovery and in energy recovery from two-phase process streams. The results of these studies and the test program are reported herein.

33935 **(NYSERDA—83-1) Wood-fired steam production at Clarkson College of Technology. Final report.** (Clarkson Coll. of Tech., Potsdam, NY (USA)). Sep 1982. 78p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

The results of the first year of operation of the wood-fired steam system installed at Clarkson College are detailed. The system is designed to burn wood chips to produce up to 10,000 lb/h of steam at 150 psig. Descriptions of the contracting process for equipment and wood fuel, equipment specifications and costs, and the physical layout of the equipment are included. The operating experience for the first heating season is outlined and the economic impact of the system is analyzed. To assist others who are considering wood conversions, the economic benefits of similar systems are also projected and equations which can be used in conducting project-specific analyses are detailed.

33936 **(STU—78-4160) Refrigeration of milk - heating of dwelling-houses. Experimental evidence.** Maartensson, A.G. (Styrelsen foer Teknisk Utveckling, Stockholm (Sweden)). Jun 1980. 97p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750455.

Portions are illegible in microfiche products.

The experience from using warm milk and barn air as heat source is described. Heat pumps were used to warm up houses and heat water. The aim of the experiment was to investigate the efficiency of the compressor for the cooling of the milk tank. After solving the problems with heat exchangers, the heating requirements of the house have been met with the heat pump. The coefficient of performance was 3.0 at the radiator temperature of 40 degrees C.

33937 **(STUDSVIK-ET—81-160) Temperature booster of waste heat for room heating.** Dahlgren, T.; Schmeling, P. (Studsvik Energiteknik AB, Nykoeping (Sweden)). Dec 1981. 47p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750488.

Portions are illegible in microfiche products.

The report presents an assessement of the method of boosting the temperature and applying it to industrial use of waste heat and district heating. The cost of the equipment is estimated to between 1100 and 2200 SEK/kW. The potential of the development is being investigated. The method comprises a complement to compressor-driven heat pumps.

3206 Municipalities And Community Systems

REFER ALSO TO CITATION(S) 33278, 33810, 33903, 33903, 33905, 33937

33938 **(ANL/CNSV-TM—112) Design and operation of a demonstration sanitary landfill developed to optimize the generation and capture of combustible gas.** (Engineering-Science, Inc., Arcadia, CA (USA)). Mar 1983. Contract W-31-109-ENG-38. 70p. NTIS, PC A04/MF A01. Order Number DE83011658.

Facilities consisting of six model sanitary landfill cells, each with a capacity of approximately 450 cubic yards of municipal waste, and auxiliary subsystems were constructed in the San Fernando Valley, north of Los Angeles, California. The site, earth work, municipal waste, and processing of waste were provided by the Bureau of Sanitation, Department of Public Works, city of Los Angeles. Municipal waste in each cell is contained in a 30-mil thick polyvinyl chloride (PVC) plastic sheeting that forms a virtually gas-tight envelope. Three pairs of cells were filled with waste: two cells with as-collected urban waste, two with shredded waste, and two with shredded and air classified waste. One cell from each pair was used as a control cell; the other cell was used as an experimental cell. Systems were provided for adding measured amounts of water, removing and recirculating leachate, extracting gas, and measuring gas flow. During the demonstration period, the rate of gas production, quantity and composition of gas produced, and internal cell characteristics were measured to determine the effects of mechanical processing (shredding and air classifying) moisture content, and leachate pH.

33939 **(ANL/CNSV-TM—113) Study of zones of vacuum influence surrounding landfill gas-extraction wells.** Lofy, R.J. (Lockman and Associates, Monterey Park, CA (USA)). Mar 1982. Contract W-31-109-ENG-38. 138p. NTIS, PC A07/MF A01. Order Number DE83012463.

Within the industry, a number of contradictory and unsubstantiated design concepts evolved concerning landfill gas recovery systems. This study was designed: (1) to expand available knowledge, (2) to provide basic research data that could be used to verify computer models of the extraction process, (3) to confirm or disprove various design concepts, and (4) to clearly establish basic physical principles. This study has shown that many of the previously held hypotheses about steady state, isotropic, homogenous, symmetrical conditions occurring in a landfill are erroneous. The zone of vacuum influence surrounding a well is neither necessarily symmetrical nor constant. Instead, it is apparently in a constant state of flux in response to one or more external variables. There is strong evidence to suggest that barometric pressure is one of the external variables responsible for the transitory fluctuations in the zone of vacuum influence surrounding a well and the resultant intrusion of air into a landfill.

33940 **(ANL/CNSV-TM—114) Applications manual for analyzing landfill methane-recovery data using the Computer Analysis of Field Data (CAFD) interactive graphics system.** (Geotechnics, Inc., Columbus, OH (USA)). Jul 1982. Contract W-31-109-ENG-38. 96p. NTIS, PC A05/MF A01. Order Number DE83011657.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Computer Analysis of Field Data (CAFD) is an interactive computer software system that was developed to analyze and display data obtained during field monitoring studies associated with recovery of methane from landfills. The software is written in Basic for use on a Tektronix 4054 dynamic graphics minicomputer and display terminal. Required peripherals include a single floopy disk drive, a digitizing tablet, a hard-copy unit, and an x-y plotter. The analysis portion of the software compares and statistically correlates data sets and performs interpolation and filtering of data as a function of time. The display portion of the software presents data at particular sampling points as a function of time and presents contour and olbique plots of data at sampling points located in a two-dimensional grid pattern. The applications manual contains four separate but interrelated sections: an engineer's application guide, an overview of the CAFD interactive graphics system, and operator's manual, and instructions for creating data files and site maps.

33941 **(NP—3770058) Business report of the NWK 79: 1st October 1977 - 30th September 1978.** (Nordwestdeutsche Kraftwerke A.G., Hamburg (Germany, F.R.)). May 1979. 37p. (In German). NTIS (US Sales Only), MF A01. Order Number DE83770058.

Microfiche only, copy does not permit paper copy reproduction.

A description of the structure and the activities of this large electric utility company is given. It had also served as an information basis for the general meeting held on May 10th, 1979. The ex-

planations on the annual balance of 1977/78 are presented in the report of the executive board. Enclosed are the balance until 30th September 1978 as well as the loss and profit account.

33042 **(SNV-PM—1494) Manure and energy from municipal wastes through biogas-fermentation.** Kirchman, H. (Statens Naturvaardsverk, Solna (Sweden)). Dec 1981. 33p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750456.

The fermentation of unsorted domestic waste mixed with sewage sludge under thermophilic conditions is demonstrated and described. The fermentation is satisfactory when the waste is carefully sorted. The final product is then acceptable as manure. The energy obtained by fermentation would contribute only very marginal amounts to the energy requirements of the country. Composting which follows a careful sorting of waste seems to be the best way to dispose of the domestic waste. Metal, glass, paper and possibly plastics should be recycled, and digested sludge must be treated separately. Any residues that may result must be burnt or dumped even in the future.

33043 **(VTT-TUTK—109) Leak location in district heating networks using acoustical correlation techniques.** Turtiainen, H. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Jul 1982. 95p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).

Rapid location and repair of leaks in district heating networks is essential in preventing corrosion and insulating materials' damages caused by leaked water. There is an urgent need of more accurate location methods. In leak location in water distribution networks noise created by a leak is measured using two pick-ups bracketing the leak. Noise created at a certain moment reaches both pick-ups, but there is a time delay between arrival moments. The time delay can be found out using cross-correlation techniques. When the velocity of sound in the pipe is known, it is possible to calculate the position of the leak. In this work the application of acoustical correlation techniques to leaks in district heating networks is studied. In the theoretical part the propagation of sound in ducts and its effect on the cross-correlation function are considered. The most important observation was that when the size of the pipe is increased, the dispersion of sound waves also increases this tending to obscure the cross-correlation function. This makes the location more difficult. The method was field-tested by locating 17 real leaks. The theory and the measurements were in agreement: 50% of all the leaks and 80% of leaks in pipes with a diameter less than 200 mm were successfully located. The conclusion was that acoustical correlation techniques can be used to locate leaks in district heating networks where dispersion is slight.

33044 **(RFP-Trans—399) Process for removal of heavy-metal ions from waste water.** Goto, S.; Nagura, T. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Apr 1983. Contract AC04-76DP03533. C; Japanese Kokai Patent Publication No. Sho 52-87860 (1977). 6p. NTIS, PC A02/MF A01. Order Number DE83011637.

A process for removal of heavy-metal ions from waste water is characterized by the fact that a waste water containing heavy-metal ions is brought into contact with active ferrite to adsorb the heavy-metal ions, followed by desorption of the heavy-metal ions by bringing this active ferrite into contact with a strong acid at a pH of 2 or lower.

33045 **Between public and private: a new common ground.** Calthorpe, P. *Proceedings of the Annual Meeting - American Section of the International Solar Energy Society;* 6: 646-650(1981). (CONF-810925—). Portland, OR, USA (8 Sep 1981).

The sociological and energy advantages of communities with commons areas are examined. (LEW)

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

REFER ALSO TO CITATION(S) 33927

3301 Internal Combustion Engines

REFER ALSO TO CITATION(S) 34010

33046 **(BMFT-FB-HA—82-018) Reduction of noise emitted by medium-speed diesel engines by partial encasing.** Donath, G.; Fackler, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 56p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750114.

Large medium-speed Diesel engines now have an overall noise level of 105 to 110 dB(A). Since the noise-reducing measures taken on such engines have so far almost exclusively been directed to the major noise source - the turbo-supercharging tract - the aim of the project was to investigate the possible reduction of the overall noise level by covering a large part of the surface with engine-borne cladding. Of great importance in this was the design of the openings for maintenance work. The experimental encapsulation reduced the noise level by 11,5 dB(A), though with almost complete cladding of the surface. It was proved that with restriction of the cladding to the louder upper parts, the benefits decrease substantially more than the costs. On the strength of the measured values, improvement proposals were drawn up, largely involving design details in connection with the low-maintenance sliding doors concept. The sum of the improvement possibilities represents the cataloque of measures for further reducing the noise level to 85 dB(A) requested by the project coordinator. However, on the strength of the measured values, one cannot decide whether this objective can be attained in the case of a rigidly mounted engine because of the transmission of the structure-borne noise through the foundation.

33047 **(BMFT-FB-T—83-025) Development of ceramic automobile turbine engine components.** Langer, M.; Siebels, J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Mar 1983. 126p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750869.

Volkswagen is involved in the development of ceramic components for an experimental gas turbine designed for an output in the region of 100 kW. Parts have been developed in cooperation with companies in the ceramics industry. Volkswagen's role has been in the design, technical calculations and experimental testing of components. During the program, statically loaded ceramic parts have reached the stage where satisfactory application has been demonstrated. An example is the successful hot testing of a turbine stator ring. Components which remain critical under realistic service conditions are the rotating parts. Monolithic axial turbine rotors made from reaction bonded silicion nitride (RBSN) have been cold tested successfully up to circumferential speeds in excess of 400 m/s. To date, tests of monolithic sintered silicon carbide (SSiC) radial turbine rotors under normal operating conditions have met expections. Individual RBSN turbine blades mounted in metal discs have satisfied qualification tests. Material development, especially for RBSN, has shown progress which has enabled this material to be used in highly stressed parts. Because of their higher density and strength, sintered or hot pressed materials, with very small qualities of sintering additives, in applications with rationalized fabrication processes, are candidates for future components development and application alongside other newly developed materials.

33048 **(DOE/NASA/51040—46) Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine.** McLallin, K.L.; Kofskey, M.G.; Civinskas, K.C. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center; AVRADCOM Research and Technology Labs., Cleveland, OH (USA)). 1983. Contract AI01-77CS51040. 24p. (NASA-TM—83359; CONF-830635—1). NTIS, PC A02/MF A01. Order Number DE83011470.

From 19. AIAA-SAE-ASME joint propulsion conference; Seattle, WA, USA (27 Jun 1983).

The performance of a variable-area stator, axial flow power turbine was determined in a cold-air component research rig for two inlet duct configurations. The two ducts were an interstage diffuser duct and an accelerated-flow inlet duct which produced stator inlet boundary layer flow blockages of 11 percent and 3 percent, respectively. Turbine blade total efficiency at design point was measured to be 5.3 percent greater with the accelerated-flow inlet duct installed due to the reduction in inlet blockage. Blade component measurements show that of this performance improvement, 35 percent occurred in the stator and 65 percent occurred in the rotor. Analysis of inlet duct internal flow using an Axisymmetric Diffuser Duct Code (ADD Code) was in substantial agreement with the test data.

33949 **(NP—3770068) Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions.** Csallner, P. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 9 Jun 1981. 145p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770068.

Portions are illegible in microfiche products.

An attempt was made to describe the combustion process defined with the single-zone-combustion model for working process calculations and then to indicate semi-empirical modification rules for the parameters characterizing the combustion process in dependence of the operating point which is to be simulated. This would enable us to pre-calculate the operational behaviour of an Otto-engine relatively easy. For every operational point of the engine one obtains a good approximation of the actual pressure curve in the cylinder. All detailed procedures for calculating the nitric oxide formation and the charge cycle within the Otto-engine known up to now required to know the measured pressure distribution in order to calculate the respective operational point. Instead of the measured pressure distribution one can use the precalculated pressure distribution as a basis. This would permit the use of the calculation method suggested here in order to create the preconditions for pre-calculating the nitric oxides the advantage being that the complex calculation need to be used only where special questions need to answered and when there is no other way of solving them.

33950 **(NP—3770109) Determination of a knock criterion of the Otto-engine combustion and precalculation of the knock limit.** Franzke, D.E. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 8 Jul 1981. 169p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770109.

Portions are illegible in microfiche products; Thesis.

The objective was to develop a procedure which permits knocking and normal combustion in an Otto engine to be distinguished by means of a knock criterion based on physical principles. Therefore, a basis is found for a precalculation of the knock limit in an assumed engine propelled by a known fuel in dependance of selected influential operational parameters.

3303 Electric-powered Systems

REFER ALSO TO CITATION(S) 33886

33951 **(DOE/NASA/0059—1) Improved transistorized ac motor controller for battery powered urban electric passenger vehicles.** Peak, S.C. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center). Sep 1982. Contract AI01-77CS51044. 234p. (NASA-CR—167978; SRD—81-088). NTIS, PC A11/MF A01. Order Number DE83011771.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objectives of this program for an improved ac motor controller for battery powered urban electric passenger vehicles were: the design, fabrication, test, evaluation and cost analysis of an engineering model controller for an ac induction motor drive system, the investigation of a power level expansion to a family of horsepower and battery system voltages, and the investigation of the applicability of the ac controller for use as an on-board battery charger and for providing the function of motor reversal. Additional vehicle specifications, e.g., acceleration and pulling out of potholes, were added to the NASA vehicle specifications. Then, a vehicle performance analysis was done to establish the vehicle tractive effort-speed requirements. These requirements were then converted into a set of ac motor and ac controller requirements. The General Electric ac induction motor used in the drive is optimized to operate as a vehicle traction motor with a pulse width modulated (PWM) inverter as a power source. The motor is nominally rated 20 hp and 41 hp peak. The power inverter design is a three-phase transistorized bridge configuration with feedback diodes. The transistors are a special design General Electric high-power Darlington transistor rated 450 volts and 200 amps. The battery system voltage chosen was 108 volts. The control strategy is a constant torque profile by PWM operation to base speed and a constant horsepower profile by square-wave operation to maximum speed. A gear shifting transmission is not required. An advanced current-controlled PWM technique is used to control the motor voltage. The primary feedback control is a motor angle control, with voltage and torque outer loop controls.

3307 Emission Control

REFER ALSO TO CITATION(S) 33949

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 33129, 33276

33952 **(DFE—48) Alternative motor fuels. A survey of the government R and D efforts.** Stangert, P. (Delegationen foer Energiforskning, Stockholm (Sweden)). Feb 1982. 128p. (In Swedish). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750464.

Portions are illegible in microfiche products.

The Energy RandD Commission (DFE) has reviewed the efforts in the motor fuel area during the first two three-year periods of the energy research programme. About 112 MSEK (current prices) have been allocated during the years 1975/76-1980/81 to the fields of production, distribution and use of alternative motor fuels. The main conclusions can be summarized in the following points: - The activities up till now within the energy research programme have led to a satisfactory situation within the country for the completion of relevant development lines. - The choice between main alternatives (hydrocarbons-alcohols) requires the comparison of alternatives and studies of introduction strategies. The development of pure alcohol engines must be accomplished. - The production of motor fuels from indigenous sources is unprofitable in foreseeable time. If and when developed processes are introduced, the country accepts a cost of supply security which can at most amount to the cost of investment in production equipment. To provide for the whole of the present transportation work the totality of this cost in the order of 30 000 MSEK. Installations for several of the production processes studied should be mothballed during times when normal import is possible. - The most important development tasks are the gasification of indigenous fuels and possibly the refining of vegetable oils to diesel fuel. Other process steps either could be procured fully developed or are economically inferior.

36 MATERIALS

REFER ALSO TO CITATION(S) 34388

33953 **(ORNL—5943) Metals and Ceramics Division. Progress report for period ending December 31, 1982.** Brogden, I. (ed.). (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 94p. NTIS, PC A05/MF A01. Order Number DE83012533.

Short summaries of technical work in progress in the various functional units are presented in five parts. Chapter 1 deals with the technical activities of the Engineering Materials Section, Chapter 2 with the Processing Science and Technology Section, Chapter 3

with the Materials and Science Section, Chapter 4 with New Initiatives and Other Activities, and Chapter 5 with Specialized Research Facilities and Equipment operated in user's mode to promote collaboration and joint research with the industrial sector and university community.

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 33000, 33001, 33002, 33003, 33004, 33005, 33007, 33025, 33028, 33091, 33092, 33094, 33207, 33209, 33365, 33368, 33368, 33541, 33542, 33665, 33665, 33668, 33680, 33681, 33689, 33735, 34079, 34174, 34247, 34257

33954 **(BMFT-FB-T—82-157) Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes.** Schug, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 34p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750089.

Desulphurized flue gases were reheated with a heat-pipe heat exchanger. Finned heat pipes, some of them with a coating and some completely made of high-quality steel were subjected to different operating conditions for approx. 1000 hours. The coating proved to be unsuitable for heat transfer because it swells and detaches itself from the background material. The high-quality steels showed pitting and surface corrosion. In addition to the problems of corrosion the possibilities of cleaning were also studied to prevent deposits forming on the heat pipes. Because of the large number of limiting quantities, final solution could not be found in the available time.

33955 **(BNL-NUREG—32824) Ranking of environments in stress-corrosion cracking.** Newman, R.C.; Bandy, R. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 10p. (CONF-830445—2). NTIS, PC A02/MF A01. Order Number DE83012073.

From Corrosion '83 conference; Anaheim, CA, USA (18 Apr 1983).

Some environmental aspects of sulfur-induced stress-corrosion cracking of sensitized alloys are described. Depending on the test technique, one perceives different environmental effects. Additions properly classed as inhibitors may appear to be promoters of SCC. Environments capable of causing very rapid SCC may appear benign because of slow crack initiation. Others are not perceived as unusually aggressive towards severely sensitized material, but maintain an exceptionally high cracking potency at low levels of sensitization. Particular attention is paid to the information which can be obtained using the constant extension rate test.

33956 **(CONF-820434—20) Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys.** Szotek, Z.; Gyorffy, B.L.; Stocks, G.M.; Temmerman, W.M. (Bristol Univ. (UK). H.H. Wills Physics Lab.; East Anglia Univ. (UK); Science Research Council, Daresbury (UK). Daresbury Lab.; Polska Akademia Nauk, Wroclaw. Inst. Niskich Temperatur i Badan Strukturalnych; Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 4p. NTIS, PC A02/MF A01. Order Number DE83010773.

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Portions are illegible in microfiche products.

New, accurate, calculations of the electron momentum distribution function for the $Cu_{50}Ni_{50}$ random solid solution are presented and the role played by the positron wavefunction in determining the Angular Correlation of the Annihilation Radiation (ACAR) is discussed in quantitative terms.

33957 **(CONF-830418—4) Relationships of irradiation creep to swelling implicit in the theories of these processes.** Mansur, L.K.; Coghlan, W.A. (Oak Ridge National Lab., TN (USA)). 21 Mar 1983. Contract W-7405-ENG-26. 6p. NTIS, PC A02/MF A01. Order Number DE83011390.

From International conference on dimensional stability and mechanical behavior of irradiated metals and alloys; Brighton, UK (11 Apr 1983).

Theoretical relationships are derived expressing irradiation creep in terms of swelling, for creep by dislocation climb, by climb-enabled glide resulting from cumulative net point-defect absorption, and by climb-enabled glide resulting from cascade-induced dislocation climb excursions. In general the creep-rate-to-swelling-rate ratio is sensitive to sink densities even for a given swelling level. Implications are seen for translation from one irradiation environment to another.

33958 **(CONF-830419—6) X-ray-diffraction study of californium metal to 16 GPa.** Peterson, J.R.; Benedict, U.; Dufour, C.; Birkel, I.; Haire, R.G. (Oak Ridge National Lab., TN (USA); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie; Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83011404.

From 16. rare earth research conference; Tallahassee, FL, USA (18 Apr 1983).

The first series of measurements to determine the structural behavior of californium (Cf) metal under pressure has been carried out. The initial dhcp structure transformed sluggishly with increasing pressure to a fcc structure. A bulk modulus of 50(5) GPa was derived for dhcp Cf metal from the relative volume (V/V_0) data to 10 GPa.

33959 **(DP-MS—82-53) Development of a load cell for mechanical testing in hydrogen.** McCabe, L.P. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1982. Contract AC09-76SR00001. 10p. (CONF-821038—9). NTIS, PC A02/MF A01. Order Number DE83012087.

From 10. annual DOE compatibility conference; Albuquerque, NM, USA (26 Oct 1982).

Mechanical testing in hydrogen environments is performed on materials to determine hydrogen compatibility. Many tests are performed on small test samples in pressure vessels where monitoring of actual sample load is difficult. A method was developed to monitor small samples by placing inside the vessel a miniature load cell which is capable of measuring loads of less than 100 lbs. The load cell monitors load by means of a Wheatstone Bridge circuit composed of four strain gages. Two of the gages are mounted on a stainless steel stub which becomes part of the vessel load string; the others are wired outside the pressure vessel. Previously, load cells have been short-lived because of hydrogen diffusion into the epoxy-phenolic adhesive used to attach the strain gages to the stub. The use of a flame-sprayed ceramic, however, rather than an organic epoxy to mount the strain gages appears to produce a load cell resistant to the hydrogen test environment.

33960 (EPRI-CS—2897-Vol.2, pp 802-820) **Selection and use of alloys for flue gas desulfurization systems.** Silence, W.L.; Manning, P.E.; Asphahani, A.I. (Cabot Corp., Kokomo, IN). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.2).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The choice of the best alloy for maximum corrosion resistance to the aggressive environments in FGD systems requires the use of a carefully planned program. The program should consist of field corrosion tests conducted in operating FGD systems and a study of the performance of existing materials of construction. Laboratory tests are not discussed in this paper, however, they should be used to screen candidate alloys for inclusion in field corrosion tests. This paper describes the use and the results of field corrosion tests and describes several case histories of the use of highly alloyed materials (usually nickel-base alloys) mostly installed as maintenance items after the original materials of construction failed. Non-metallic coatings over carbon steel or lower alloyed materials such as 300 series stainless steels usually comprised the unsatisfactory original materials of construction. The use of a low original cost alloy or coating material that later proves unsuitable may end up as the most expensive material choice when replacement or repair and production loss through downtime are considered. 9 figures, 4 tables.

33961 (INIS-mf—7498, pp vp) **Influence of metallurgical variables on hydrogen assisted cracking of austenitic stainless steels.** Minkovitz, E.; Eliezer, D. (Ben-Gurion Univ. of the Negev, Beersheba (Israel)). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

33962 (LA-UR—83-1107) **Submicron, unbacked, shaped metal foils.** Duchane, D.V.; Barthell, B.L. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 16p. (CONF-830443—2). NTIS, PC A02/MF A01. Order Number DE83011169.

From Metallurgical coatings conference; San Diego, CA, USA (18 Apr 1983).

A method was developed to produce unbacked, shaped metal foils in sub-micron thicknesses. This process utilizes a temporary substrate consisting of a water-soluble polymer film as a base for the electron-beam deposition of the metal layer. After formation of the metal foil, the polymer is removed by immersion of the assembly in water. Unbacked metal-foil cylinders as thin as 0.17 μm with extremely smooth, wrinkle-free surfaces have been produced by this technique. Polyvinyl alcohol was an excellent substrate. Aluminum foils were produced.

33963 (LBL—15607) **Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer.** Farmer, J.C.; Muller, R.H. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 507p. NTIS, PC A22/MF A01. Order Number DE83011737.

A study was performed to define the functional role of surface active agents during the initial stage of electrocrystallization. The system selected for investigation involved Cu as the electrode substrate, Pb as the deposited metal, and rhodamine-B chloride as the model inhibitor. The strong absorption band of rhodamine-B in the visible spectrum made it detectable by optical techniques in submonolayer amounts on the electrode. Deposit thicknesses ranged from a single monolayer (the underpotential deposit, UPD) to thicknesses of about 1000 Angstroms. It has been found that (1) the free energy of Pb electrosorption is about 7 kcal/mol; (2) the Pb adatom in the underpotential layer is completely discharged; and (3) in the absence of rhodamine-B, a Pb monolayer completely covers the Cu surface before three-dimensional nucleation of the bulk Pb phase; (4) the bulk phase which forms on the monolayer consists of a granular, porous layer covered by large dendritic islands; (5) addition of rhodamine-B prevents complete formation of the Pb monolayer and results in more compact bulk deposits than are possible in its absence; (6) rhodamine-B inhibits dendrite growth; (7) rhodamine-B is simultaneously reduced with the Pb^{++} ion and is depleted from the electrode surface, which results in a mass transfer controlled inhibitory effect; and (8) the dye species responsible for inhibition has a preferential normal orientation on the electrode surface. A self-compensating, magneto-optic spectroscopic ellipsometer was developed for this in situ study. To support interpretations of ellipsometry data, light scattering measurements from electrode surfaces during deposit formation were also done.

33964 (LBL—15956) **Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel.** Tokushige, H. (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 157p. NTIS, PC A08/MF A01. Order Number DE83012437.

Thesis.

In the as-quenched condition, martensite of a 0.3%C-3%Cr-2%Mn steel consists of heavily dislocated laths containing fine autotempered carbides and bounded by thin films of retained austenite. Similarly, lower bainite after 10 minutes of isothermal holding at 360°C consists of dislocated bainitic ferrite laths, unidirectional intralath carbides, and interlath films of retained austenite. However, when the isothermal holding is prolonged to one hour, retained austenite has decomposed into interlath carbides in a similar manner to that observed in martensite tempered at 240 to 400°C. Crystallographic studies have revealed that bainitic ferrite laths are related to adjacent laths as well as to parent austenite through the same orientation relationships as those found for martensite laths, which strongly confirms the shear aspect in the bainite transformation. Bainitic carbides, identified as cementite, are found to have the Isaichev orientation relationship with ferrite, which supports the idea that cementite has formed directly from austenite. The lower bainitic structure is more similar to that of martensite tempered on the tempered martensite embrittlement (TME) range rather than as-quenched martensite. The as-quenched martensite exhibits a high strength and toughness, the latter being greatly enhanced by tempering at 200°C. The strength and toughness of lower bainite are substantially lower than those of as-quenched martensite, and they remain relatively unchanged upon tempering up to 400°C. Fractographic examinations indicate the similarities in the fracture mode between TME and lower bainite; in both cases, the absence of retained austenite films and the presence of coarse carbides appear to cause brittle fracture. 104 references, 52 figures.

33965 (NP—3770062) **Thermo-elastoplastic material law for application of the finite element method to calculate thermal loads.** Busbach, H. (Dortmund Univ. (Germany, F.R.). Abt. Maschinenbau). 26 Jun 1981. 105p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770062.

Portions are illegible in microfiche products; Thesis.

The flow function, necessary for a description of the elastoplastic shape changes, is given as a function of temperature, and the material constants are treated as temperature dependent parameters. The path-length scheme is selected for the finite element method. The material law, deduced to describe the three-dimensional stress distribution can be modified to calculate the two-dimensional stress distribution as well as the deformations and stresses of a circular disc exposed to thermal shock.

33966 (NP—3770066) **Fatigue strength improvement of welded high-strength steels StE 460 and StE 690 by TIG dressing.** Minner, H.H. (Technische Hochschule Darmstadt (Germany, F.R.). Inst. fuer Statik und Stahlbau). 1981. 256p. (In German). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83770066.

Portions are illegible in microfiche products; Thesis.

The study presents results of fatigue tests on different types of as-welded and TIG dressed specimens such as: - joints with butt welds, fillet welds and welded-on stiffeners; - welded beams with stiffeners and staggered splices; - rolled beams with stiffeners and with a butt weld in the flange. The test results have shown that a classification of TIG dressed specimens into several notch groups does not seem to be appropriate. By consulting a table showing characteristics of tested welded joints it will have to be decided whether and by what method a particular type of welded seam is to be dressed. A discrimination according to steel grades is not necessary, as the allowable fatigue design stresses of TIG dressed specimens are independent of the steel grade in accordance with the new S-N curve.

33967 (PNL-SA—11289) **MCC stress-corrosion-cracking rate tension test method (MCC-104S).** Anderson, W.E.; Merz, M.D. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 9p. (CONF-830426—2). NTIS, PC A02/MF A01. Order Number DE83011577.

From ASTM symposium on chevron-notched specimens testing and stress analysis; Louisville, KY, USA (21 Apr 1983).

Test procedures proposed in MCC-104S have been developed for obtaining a quantitative measure of a candidate material's response to conjoint environmental exposure and mechanical loading of defected specimens. The material cracking rate behavior is assessed from fractographic examination of a specimen after its subjection to accelerated loading experiences. Companion data from specimens tested in an acceptably benign environment provide an appropriate reference. The procedures are believed well suited for consensus standardization via ASTM processes.

33968 **(SAND—82-2498C) Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels).** Cyrus, W.L. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 24p. (CONF-830544—1). NTIS, PC A02/MF A01. Order Number DE83011299.

From 7. heat treating conference; Chicago, IL, USA (10 May 1983).

Using commercial alloy steels AISI 4130 and AISI 4340, a series of heat treating parametric studies were performed on specimens in both an electric fluidized-bed furnace and an electric neutral-salt-bath furnace. An evaluation of heat treating methods was performed by comparing tensile-test data for the two alloy steels. Surface characterization of test specimens was performed using Auger analyses to discern effects, if any, due to heat-treatment method. Certain test results are presented for two significantly different heat-treat methods and placed side by side with published mechanical test data. Environmental and safety aspects of salt-bath and fluidized-bed heat treating are discussed.

33969 **(SAND—83-8214) Slow-strain-rate testing of 2.25Cr-1Mo in molten-nitrate salt.** Goods, S.H. (Sandia National Labs., Livermore, CA (USA)). May 1983. Contract AC04-76DP00789. 44p. NTIS, PC A03/MF A01. Order Number DE83011894.

The influence of an oxidizing molten-nitrate salt (60% $NaNO_3$-40% KNO_3) on the mechanical properties of 2.25Cr-1Mo has been examined through a series of slow-strain-rate tests at 450°C and 525°C. By comparing fracture strain, reduction in area, and the ultimate strength of air-exposed specimens to these same parameters for specimens tested in the binary-salt mixture, the susceptibility of the alloy to environmental degradation could be ascertained. Exposure to the nitrate resulted in a loss of ductility as measured by either the engineering fracture strain or reduction in area at both temperatures studied. At these temperatures, the ductility loss was most pronounced at the lowest strain rates (1×10^{-7} sec^{-1}). In general, for all strain rates examined, the degree of ductility loss was greater at 525°C than at 450°C. Metallographic observations revealed that severe surface oxidation occurred as the result of exposure to the molten salt. These surface scales were found to be nonadherent and easily spalled. The rapid formation of these corrosion products and the inability of the material to form a protective barrier against further oxidation is consistent with the ductility loss observed in the salt-exposed specimens. 22 figures.

33970 **(UCRL—88485) Model for the growth of a two-phase corrosion scale.** Sutton, S.B.; Truhan, J.J.; Short, D.W. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 10p. (CONF-830508—15). NTIS, PC A02/MF A01. Order Number DE83012046.

From 163. Electrochemical Society meeting; San Francisco, CA, USA (8 May 1983).

The growth of a two-phase scale formed during the hot corrosion of nickel in CO_2/SO_2 gas mixtures at 900°C was modeled. It started with a preexisting two-phase corrosion scale that has nickel oxide crystallites growing in a continuous molten nickel sulfide matrix, and then growth rate was determined by alternating equilibrium and diffusion calculations. Calculated growth rates compare well with experimental weight gain curves, particularly when the comparison is restricted to the parabolic growth region. The model tests the sensitivity of several important growth parameters.

33971 **(UCRL—88486) Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys.** Truhan, J.J.; Benner, R.E. (Lawrence Livermore National Lab., CA (USA); Sandia National Labs., Livermore, CA (USA)). Apr 1983. Contract W-7405-ENG-48. 10p. (CONF-830508—16). NTIS, PC A02/MF A01. Order Number DE83012047.

From 163. Electrochemical Society meeting; San Francisco, CA, USA (8 May 1983).

Raman scattering has been combined with more conventional surface-analytical techniques to identify corrosion species on Ni-Cr alloys after exposure to molten Na_2SO_4 at 1000°C in air for 60 minutes. At low Cr contents, NiO is the primary oxidation product, and, at intermediate Cr contents, $NiCr_2O_4$ predominates. Higher Cr contents (15 wt % and greater) produce a coherent Cr_2O_3 scale. The sulfidation is severe for Ni-2Cr but mild for the other alloys. The degree of sulfidation for Ni-15Cr and greater is independent of alloy composition. Scanning electron microscopy and energy dispersive x-ray enalysis were used to verify the Raman results.

33972 **(UPTEC—8077-E) Spectrally selective films for IR-reflectance of lamp bulbs.** Gustafsson, P. (Uppsala Univ. (Sweden). Inst. of Technology). Sep 1980. 34p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750494.

Portions are illegible in microfiche products.

Since a great part of the power input in an incandescent lamp is converted into thermal radiation one should be able to raise the light output by coating the inside of the lamp with a selective film such that only the visible light is transmitted while the thermal radiaction is reflected back on to the filament. Several different filmstacks are possible, but in this report zinc sulphide - silver - zinc sulphide films have primarily been studied. Computer calculations have shown films with 30 to 35 nm zinc sulphide layers and 15 to 20 nm silver layer to be the best. Such films have then been produced by evaporation and their transmission and reflection investigated. Unassembled lamps were coated with three layer films and sent to Lumalampan for assembling and determination of their light output. It turned out to be higher in an uncoated lamp than in a coated lamp (between 9.5 and 10.5 lm/W). This negative result probably depends on nonfocussed reflection of thermal radiation on the filament. One only gets a lower transmission. Some viewpoints on industrial production are also given.

33973 **(VTT-TUTK—82-59) Assessment of the creep damage and residual life of steam pipings.** Auerkari, P.; Kemppainen, H. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Jan 1982. 29p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).

The replica method appears to be a useful NDT method that can be used with confidence for assessing the residual life of steam pipings. Selection of the places to be inspected and evaluation of the creep damage as indicated by replicas are presented on the basis of the experiences available today. Possibilities for creep crack growth in a steam pipe have also been considered.

33974 **(Y/DV—282) Computer programs for calculating thermal distribution on uranium-6 weight percent niobium alloy during electron-beam welding.** Stanaland, V.A.; Chapman, L.R.; Mustaleski, T.M. Jr. (Oak Ridge Y-12 Plant, TN (USA)). 28 Feb 1983. Contract W-7405-ENG-26. 31p. NTIS, PC A03/MF A01. Order Number DE83011076.

Two computer programs (TEMP and PEAK) were generated to predict the thermal history and peak temperature at a specified point on a plate of uranium-6 wt % niobium (U-6Nb) alloy during electron-beam (EB) welding. The TEMP program predicts the thermal history of a point fairly accurately, but the predicted cooling rates are a little fast. The heat input efficiency of the electron beam was found to be around 55 percent. The PEAK program was designed to predict peak temperatures; however, an increase in heat transfer efficiency was found as distance from the weld fusion boundary increases, indicating an error which is probably due to the lack of a correction factor for specific heat values.

33975 **Application of composite heat transfer tubes in power plants.** Hoffman, E.E. *Materials and Components in Fossil Energy Applications;* No. 40, 1-2(1 Oct 1982).

Metallurgically bonded composite steel tubes have the potential to fulfill combined corrosion and strength requirements in power plants which cannot be met by existing tube materials. The component materials can be chosen freely among existing steel grades as long as heat treatment compatibility during manufacture is ensured. Service trials with a composite superheater tube made of a high creep strength austenitic steel clad with a 25Cr-20Ni steel were carried out with encouraging results. The corrosion rate was found to be lowered to about one third of that for conventional austenitic superheater steels. This good experience has led to installation on a larger scale of this type of composite tube in the final superheaters of a number of coal-fired power stations in the United Kingdom. A composite tube with 50 Cr-50 Ni alloy in the outer component has been put into service in superheaters with extremely

severe corrosion conditions. The reported results indicate a considerably increased life on these tubes in relation to conventional austenitic superheater tubes.

33976 **Corrosion-erosion-wear of materials in emerging fossil-energy systems.** Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). 990p. (CONF-820144—). NTIS, PC A99/MF A01. Order Number DE83009716. Contract W-7405-ENG-48.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Thirty-one papers are presented under the following session headings: metals behavior in reactive gases/slag, surface behavior in liquid systems, surface stability in particle environments, fluidized-bed combustors, combustion engines, and research in progress. Separate abstracts were prepared for 29 of the papers; the remaining two papers had been previously abstracted. (DLC)

33977 **Mechanism of corrosion in multiple component gases at high temperatures.** Birks, N.; Meier, G.H. (Pittsburgh, Univ., PA). pp 1-53 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC01-79ET13547.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The mechanisms of reaction of pure metals and alloys in gases containing two or more of the oxidants oxygen, sulfur, carbon, and nitrogen are reviewed. The reactions involving pure metals are described first since the mechanisms and thermodynamics are rather well understood for this case. The reactions of alloys in relatively simple atmospheres (only two oxidants) are described next followed by the limited results obtained in more complex atmospheres such as those pertaining to coal gasifiers. Finally, several recommendations are made for further study which may improve the understanding of reaction mechanisms and lead to more resistant alloys or coatings. 53 references, 21 figures.

33978 **Erosion of metal alloys and their scales.** Levy, A.V. (Lawrence Berkeley Lab., CA). pp 298-376 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC03-76SF00098.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

A new platelet mechanism of erosion for ductile metals is defined, set in historical perspective, and evidence of its validity is presented. The effects of various mechanical properties of metals on their erosion by particles carried in gas streams is reported and related to the proposed erosion mechanism. Elevated temperature erosion and combined erosion-corrosion is discussed. The erosion of oxide and oxide-sulfide scales performed in-situ on metals at elevated temperature is reviewed. The data presented indicates that erosion should be thought of in a different manner from that proposed in the bulk of the literature of the 1960's and 1970's. Properties of alloys such as ductility, strain hardening coefficient and some thermal properties that have not previously been considered in selecting alloys for erosion service are the important selection factors, particularly ductility. Hardness and strength, generally used in the past to guide material selection, do not relate to erosion resistance in the manner prescribed to them in the older erosion literature. Their use in selecting alloys needs to be greatly modified. 29 references, 43 figures, 5 tables.

33979 **Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests.** Spengler, C.J. (Westinghouse R and D Center, Pittsburgh, PA); Lee, S.Y.; Mulik, P.R.; Whitlow, G.A.; Cohn, A. pp 601-641 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

A program is in progress to detect possible materials problems in the turbines with a series of tests in a turbine simulator. The initial fuel used was an SRC-II blend. The test simulated conditions in which the metal temperatures varied between 704°C and 1010°C at various gas temperatures from 899°C to 1260°C, at a pressure of 3.1×10^5 Nm^{-2} absolute (3 atm abs) and a velocity of 1.82×10^3 ms^{-1} (600 fps). Tests with gas/metal temperature combinations of 1093°C/871°C for 230 hours and 899°C for 264 hours on nickel- and cobalt-based superalloys and a Pt-NiAl coating produced normal oxidation typical of that associated with the use of natural gas and distillate fuels. A 296-hour test with a gas temperature of 1260°C, and a nominal metal temperature of 899°C indicated accelerated attack, especially of cobalt-based superalloys. Deposits at all temperatures were principally Fe-oxide and poorly crystalline (K, Ca)-aluminosilicates. Some Na-based sulfate formed at the 1260°C gas temperature. The alkali-alkaline earth sulfate and the presence of metals (V, Cu) was responsible for attack in excess of oxidation at the 1260°C gas temperature. Elements found in the deposit, such as Fe, Cr, Cu, V, and Zn, were either present originally in the coal-derived liquid (CDL) fuel or derived from the dissolution of fuel handling systems by the CDL. Storage of fuel, even with circulation periods of 24 hours prior to procurement, tended to produce selective settling of such trace elements as Ca, Ti, and alkalis, with subsequent variation of ash content. Iron, however, remained in the supernatant. 14 figures. 8 tables.

33980 **Erosion behavior of materials in multiphase flows.** Tabakoff, W. (Cincinnati Univ., OH). pp 642-676 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC01-76ET10620.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

With increasing interest in the burning of coal in industrial gas turbines or using synthetic fuels, there is also concern for the determination of the erosive effects on the turbine components. In order to provide the basis for alloy selection in future turbines using coal, or synthetic fuel, an investigation is undertaken to obtain a basic understanding of the mechanisms of erosion at high temperatures. For this purpose, test equipment has been designed to simulate the aerodynamic and thermodynamic conditions in the turbine. Data were obtained for 304 stainless steel, Rene 41 and A286 alloys at temperatures between ambient and 120°F. In addition, the equations that govern the three-dimensional motion of the solid particles suspended by a compressible gas flow through a rotating cascade of a turbomachine, are formulated. These equations are solved for the case of flow through a turbine stage. The solution takes into account the loss in particle momentum due to their collision with the turbine blade casing. The results obtained from this study indicate the locations on the turbine blades subjected to erosion damage.

33981 **High temperature sulfidation properties of iron-chromium-base alloys.** Smeltzer, W.W.; Narita, T.; Przybylski, K. (McMaster Univ., Hamilton, Ontario). pp 860-880 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Fe-Cr and Fe-Cr-Al alloys were investigated in H_2S-H_2 at 700, 800 and 900°C. Sulfidation of Fe-Cr alloys containing up to 50 wt% Cr obeyed parabolic kinetics at 800°C and $PS_2 = 10^{-10}$ and 10^{-7} atm. Kinetics at the lowest sulfur pressure increased from a very low value by three orders of magnitude as the Cr content increased from 5 to 50%. Sulfidation rates at $PS_2 = 10^{-7}$ atm were most rapid. The scales were duplex containing (CrFe)S/sub x/ or (FeCr)S plus small amounts of $(CrFe)_3S_4$. Parbolic sulfidation behavior of an Fe-25Cr alloy could be divided into three regions de-

pendent upon sulfur pressure. At 700°C, these regions corresponded to formation of a (CrFe)S/sub x/ scale at low sulfur pressure, $PS_2 < 10^{-10}$ atm, a (FeCr)S scale at intermediate sulfur pressres, $10^{-10} \leq PS_2 \leq 10^{-7}$ atm, and a duplex $(CrFe)_3S_4$-(FeCr)S scale at high sulfur pressures, $PS_2 > 10^{-7}$ atm. These critical sulfur pressures of 10^{-10} and 10^{-7} atm shifted toward higher pressures at higher temperatures to become 10^{-8} and 10^{-3} atm at 900°C. Parabolic growth of the scales on an Fe-25Cr-10Al alloy was observed. At high sulfur pressures, $PS_2 = 10^{-3}$ atm, this ternary alloy sulfidized at a rate of the order one magnitude less than the Fe-25Cr alloy. This rate decrease became 10^{-2} at intermediate sulfur pressures, $PS_2 < 10^{-3}$ atm, and of 10^{-3} at $PS_2 < 10^{-6}$ atm. The scales were duplex. The outer plates and needles were composed of FeS, their basal sections containing small Al and Cr contents. The grains of the inner layer contained quaternary sulfide phases. 13 figures.

33982 Erosion/corrosion of superalloy test coupons exposed to PFB coal combuster effluent. Benford, S.M.; Kutina, F.J. (NASA, Lewis Research Center, Cleveland, OH). pp 881-909 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Small superalloy test coupons were exposed to the effluent of a pressurized fluidized bed coal combustor at gas temperatures near 1090K and solids loadings from 5400 to 36,000 ppM. After 37 hours, all samples exhibited moderate to severe erosion attack. Erosion rates were a function of particle velocity and solids loading. Most samples placed in the highest velocity station 210 m/s (700 fps) were eroded to a bare metal knife edge. The average leading edge erosion rates at this station ranged from 10 μm/h (0.4 mil/h) at 5400 ppM (0.3 grains/std ft^3) to about 150 μm/h (6 mils/h) at 36,000 ppM (2.0 grains/std ft^3). Coupons in the lower velocity stations exhibited less severe erosion attack, but hot corrosion attack was observed on the leading edge of parallel specimens and on the exposed side of angled specimens. Hot corrosion did not appear on the trailing edge or on unexposed surfaces. These results suggest that the erosion-enhanced hot corrosion of uncoated utility turbine blades may be a serious problem at moderate local erosion rates associated with solids loadings below 1800 ppM (o.1 grains/std ft^3). 21 figures.

33983 Material loss and ripple formation during solid particle erosion at 30° impact angles. Brown, R. (Rhode Island Univ., Kingston); Edington, J.W. pp 910-932 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Copper single crystals were eroded at 30° to the (111) face by 210μm silica spheres impacting at a velocity of 133 m/s. Examination of eroded surfaces and metallographic sections by scanning electron microscopy and of erosion debris by transmission electron microscopy was performed. It was observed that ripples formed by combined subsurface crack propagation and surface shear. Material loss was by a flaking process similar to delamination from the tips of ripples. Ripple growth by a picking up process was found to produce steady state erosion conditions. Direct evidence of recrystallization of surface layers was obtained. 8 figures.

33984 Oxidation of chromium in H_2-H_2O-H_2S gas mixtures. Yurek, G.J.; LaBranche, M.H. (Massachusetts Inst. of Tech., Cambridge). pp 933-958 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC02-79ER10507.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The oxidation of chromium in H_2-H_2O-H_2S gas mixtures is considered for conditions wherein Cr_2O_3 is the thermodynamically stable phase in the Cr-S-O system. Both oxide and sulfide may nucleate on pure chromium in the initial stage of reaction. The relative amounts of oxide and sulfide formed initially appear to be related to the relative rates of adsorption of H_2O and H_2S on chromium. Nonprotective two-phase (oxide/sulfide) scales continue to grow on chromium when the H_2S/H_2O ratio in the gas phase is high. The morphological features of scales associated with the penetration of Cr_2O_3 by solid-state diffusion of sulfur and by transport of sulfur-bearing gaseous species through physical defects in Cr_2O_3 are discussed. 8 figures.

33985 Hot corrosion/fouling of metals beneath surface deposits. Fang, W.C.; Miglin, B.P.; Rapp, R.A. (Ohio State Univ., Columbus). pp 959-980 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

In a large variety of high temperature engineering systems, solids or liquid salts are deposited on hot alloy surfaces either from entrained colloidal particles or by the condensation of vapor. In each case, the deposit may introduce a microenvironment at the alloy/gas or scale/gas interface which is different from that in the bulk gas phase. Specific examples of important deposit/substrate interactions are reviewed: porous inert solid deposits, porous (or dense) reactive solids, and fused reactive deposits. Severe hot corrosion may occur with the electrochemical attack of metals beneath thin fused salt films. Electrochemical techniques are being applied to interpret the details of hot corrosion mechanisms. Reference is made to recent mechanistic electrochemical studies.

33986 Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb. Coleman, C.E. (Atomic Energy of Canada Ltd., Chalk River, Ontario). *American Society for Testing and Materials, Special Technical Publication;* No. 754, 393-411(1982).

Hydride reorientation and delayed hydrogen cracking have been evaluated in specimens cut from the longitudinal and circumferential directions of cold-worked Zr-2.5Nb pressure tubes. In this material basal plane normals were highly concentrated in the circumferential direction. In longitudinal specimens hydrides did not reorient, cracks were not initiated, and artificial cracks grew slowly and only at K/sub I/ > 15 MPa √m 25 times faster than cracks at the same K/sub I/ in longitudinal specimens. Reorientation of hydrides is not necessary for delayed hydrogen cracking, but the degree of reorientation controls cracking susceptibility. Crystallographic texture regulates hydride reorientation and a rotation of basal plane normals from the circumferential to radial direction should reduce the susceptibility of Zr-2.5Nb and other zirconium alloys to delayed hydrogen cracking.

33987 High-strength, creep-resistant excel pressure tubes. Cheadle, B.A.; Holt, R.A.; Fidleris, V.; Causey, A.R.; Urbanic, V.F. (Atomic Energy of Canada Ltd., Chalk River, Ontario). *American Society for Testing and Materials, Special Technical Publication;* No. 754, 193-207(1982).

Pressure tubes for CANada Deuterium Uranium Pressurized Heavy Water reactors are made from Zr-2.5Nb by extruding preheated hollow billets into tubes that are cold-worked 30 percent to size. The fabrication process produces fine elongated α-grains with a high dislocation density which makes a large contribution to the tensile strength of the tubes but increases in-reactor creep and growth rates. The alloy Excel (Zr-3.5Sn-0.8Mo-0.8Nb) is stronger and more creep resistant than Zr-2.5Nb and is being developed as a pressure tube material. Tubes have been fabricated that are as strong as the Zr-2.5Nb tubes but they have more equiaxed α-grains with much lower dislocation densities. The tubes corrode faster than the Zr-2.5Nb tubes and will require 0.1 mm more corrosion allowance of the 4.1-mm-thick walls. However, there in-service axial elongation and diametral expansion due to irradiation creep and growth will be 70 percent less than the Zr-2.5Nb tubes.

33988 Laser fluorescence spectroscopy of molecular molybdenum isolated in rare gas matrices. Pellin, M.J.; Foosnaes, T.; Gruen, D.M. (Argonne National Lab., IL). *ACS Symposium Series;* No. 179, 219-227(1982). Contract W-31-109-ENG-38.

Characterization of the vibronic structure of the homonuclear molybdenum diatom in argon matrix supports has been accomplished by laser fluorescence spectroscopy. A ground state vibrational frequency of 475 (+- 4.5) cm^{-1} was determined for Mo_2 isolated in either of two matrix sites whose presence is manifested by spectrally shifted emission. The presence of two trapping sites gives rise to complicated overlapping absorption spectra which have been separated and elucidated by excitation spectroscopy. As well Raman spectra of these matrices show a peak at 476 cm^{-1}. The measured emission lifetimes are long and generally not single exponential. In argon matrices 2.1 msec decay times were measured from one site and a tri-exponential decay with components of 2.1 msec, 3.93 msec, and 6.3 msec were measured. The length of these lifetimes and the large spectral shift of the emission relative to the excitation energy leads to the conclusion that emission does not emanate from the initially excited, optically allowed level detected in absorption. Rather emission must occur from one of the dense manifold of higher spin multiplicity levels which lie at slightly lower energies than the ^{1}E/sub u/ level coupled by laser radiation to the ^{1}E/sub g/ ground state.

33989 Medium carbon steel alloy design for wear applications. Salesky, W.J. (Lawrence Berkeley Lab., CA); Thomas, G. *Wear;* 75: 21-40(1982). Contract W-7405-ENG-48.

The fracture characteristics of steels are strongly influenced by martensite substructure, retained austenite stability, and morphology. Attractive strength-toughness properties have been attained with Fe-Cr-C-Mn alloys. These alloys, when tested under sliding wear conditions, also exhibit good wear resistance which compares favorably with that of commercial wear-resistant alloys. The most significant finding is an apparently strong correlation between sliding wear resistance and retained austenite, which in turn appears to correlate with Charpy impact properties. Little correlation was observed beween hardness and wear resistance for the experimental steels. 13 figures, 3 tables.

33990 High sensitivity surface crystallography: illustrative LEED analyses of Cu(100) and Ag(110). Noonan, J.R.; Davis, H.L. (Oak Ridge National Lab., TN). *Vacuum;* 32: No. 2, 107-112(1982). Contract W-7405-ENG-26.

Results obtained from studies of the Cu(100) and Ag(110) surfaces indicate that LEED structural analyses of clean metallic surfaces can be sensitive to changes on the order of 0.02 A in atomic spacing. This sensitivity was achieved by placing particular emphasis on both obtaining a reliable experimental data base and studying the effects of nonstructural parameters which are used in dynamical LEED calculations. Error reduction in the experimental I-V profiles was accomplished by using a technique where nonspecular profiles, collected for normal incidence, were averaged over their symmetrically equivalent set. Studies were then performed on the effects which variation of the nonstructural parameters (scattering phase shifts, complex optical potential, and Debye temperature) had on the structural conclusions of the analyses. The only structural parameter varied in this work was the first interlayer spacing. The best results from sets of calculations exhibited very good agreement with the mean experimental profiles. Although the improved sensitivity very good agreement with the mean experimental profiles. Although the the improved sensitivity obtained in these analyses was achieved only for clean metallic surfaces, it is felt that the techniques employed in our investigations are generally applicable to other surface systems. 5 figures, 2 tables.

33991 XPS evidence for 5f bonding participation in UO_2. Cox, L.E. (Los Alamos National Lab., NM). *Journal of Electron Spectroscopy and Related Phenomena;* 26: 167-171(1982).

Numerous theoretical and experimental investigations of the electronic structure of the oxides of uranium have been carried out in recent years. The debate concerning the importance of the 5f orbitals in bonding is yet unresolved. The aim of this study was to re-examine some of the earlier evidence against 5f bonding and to attempt to rationalize, using some experimental data and calculations, the apparent discrepancies previously mentioned. The three oxides studied (UO_2, ThO_2, and Al_2O_3) could be sputter-cleaned without decomposition or changes in stoichiometry. Both sintered and single-crystal UO_2 (100) were studied and found to give very similar spectra. The Al_2O_3 sample was a disc of polished sapphire; the ThO_2 sample was single crystalline. The assessment of the electronic configuration of UO_2 was based on: (1) the chemical shift of its 4f levels relative to α-U; and (2) the intensity of the O 2p-containing valence band. These topics were discussed. Results agree with Veal et al. that the intensity of the 2p bonding band, because its intensity varies linearly with O:U ratio, is essentially devoid of 5f character, is incorrect. The linear relationship arise quite coincidentally from the fact that the 5f contribution in this band is approximately proportional to the O:U ratio. Recent calculations for UO_3^{2+}, for example, show a 5f population of $\sim$ 2.5 electron. Oxides or oxyanions of uranium which contain uranyl-type bands would therefore be expected to exhibit banding valence bands more than twice as intense as those of UO_2. 1 figure, 2 tables.

33992 Hydrogen reduction of cobalt ferrite. Porter, J.R.; de Jonghe, L.C. (Lawrence Berkeley Lab., CA). *Metallurgical Transactions, [Section] B: Process Metallurgy;* 12B: 299-309(Jun 1981). Contract W-7405-ENG-48.

The kinetics of reduction of cobalt ferrite by hydrogen as a function of reduction temperature and preasure have been measured by thermogravimetric analysis. A minimum in the rate as a function of temperature has been observed and its cause attributed to the formation of a cobalt-wuestite subscale at higher reduction temperatures. A mathematical model, based on one derived by Spitzer, Manning, and Philbrook, has been used to interpret the results in terms of the rate constants for the individual steps in the reaction. Optical microscopy has been used to characterize the morphology of the reduction product and, additionally, partially reduced single crystals of cobalt ferrite have been examined by transmission electron microscopy to characterize the microstructure of the reaction interface. A fine network of pores in the reduced scale was shown to allow the reducing and product gases to reach the immediate vicinity of the chemical reaction. The structure of the porosity and consequently the effective diffusion coefficient in the scale were both shown to be functions of the reduction temperature and pressure. The interface reaction was shown to follow Langmuir-Hinshelwood kinetics. A model was developed to explain such kinetics by incorporating a solid-state diffusion step. Such a step was considered necessary to explain the development of the observed microstructures. An incubation time for the development of a continuous cobalt-wuestite subscale at higher reduction temperatures was attributed to the different growth kinetics for the spinel-metal and spinel-wuestite interfaces.

33993 Modeling of continuous strip production by rheocasting. Matsumiya, T.; Flemings, M.C. (Massachusetts Inst. of Tech., Cambridge). *Metallurgical Transactions, [Section] B: Process Metallurgy;* 12B: 17-31(Mar 1981). Contract EX-76-A-01-2295.

A process was experimentally and mathematically modeled for continuous and direct production of metal strip from its molten state by the use of Rheocasting. The process comprises 1) continuous production of a Rheocast semisolid alloy, and 2) direct shaping of the semisolid into strip. Sn-15 pct Pb was used as the modeling alloy. Crack formation and surface quality of the strip produced depend on fraction solid and deformation force. Continuous, sound strip could be obtained with good surface quality when fraction solid was between 0.50 and 0.70 and deformation force did not exceed a given maximum. Sheet thickness depends on deformation force, fraction solid, rotor rate of Rheocaster and production line speed. At constant deformation force, sheet thickness increases as fraction solid increases, rotor rate decreases and line speed is reduced. Sheet thickness is larger in the center than in the edge, but the difference is reduced by applying edgers. Some segregation of lead toward the edges is observed, ad the segregation increases as amount of deformation is increased. A mathematical model for heat flow, solidification and deformation was constructed. The model predicts the point of completion of solidification in the strip and

sheet thickness as a function of deformation force and line speed. Calculations are in good agreement with experimental results.

33994 **Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra.** Schwalbe, L.A.; Trussell, H.J. (Los Alamos National Labs., NM). *X-Ray Spectrometry;* 10: No. 4, 187-192(1981).

The maximum a posteriori formalism is reviewed, the technique is applied to the deconvolution problem of energy-dispersive x-ray fluorescence spectra. An exact closed-form expression for the a priori probability density is derived from physical considerations. A single Cu-Zn spectrum is taken to illustrate the effects of various assumed forms for the restored spectrum probability distributions. The best results follow from calculations that involve a self-consistency condition. These restorations are contained within the set of maximum likelihood solutions.

33995 **Mechanics and mechanisms of intergranular cavitation in creeping alloys.** Argon, A.S.; Chen, I.W.; Lau, C.W. (Massachusetts Inst. of Tech., Cambridge). pp 23-49 of Three-dimensional constitutive relations and ductile fracture. Nemat-Nasser, S. (ed.). Amsterdam, Netherlands; North-Holland Publishing Company (1981). Contract AC02-77ER04461.

From IUTAM symposium on three-dimensional constitutive relations and ductile fracture; Dourdan, France (2 Jun 1980).

The formation of grain-boundary cavities by vacancy aggregation in creeping alloys at elevated temperatures requires interface tensile stresses in excess of 5×10^{-3} E. Such high stresses can occur across the faces of grain-boundary particles during early phases of grain-boundary sliding with local power-law creep accommodation, provided that the particles are larger than a critical size and the applied stress is in excess of a threshold value. Thus, cavitation begins as soon as grain-boundary sliding begins. Continued cavity nucleation during creep is a result of the stochastic nature of grain-boundary sliding. Wedge cracks at triple grain junctions normally do not nucleate as a separate entity during creep, but instead result from accelerated cavity growth in response to concentrated tensile stresses that build up there as the shear traction on sliding boundaries is relaxed. Experimental detection of critical size cavities of c.a. 10^{-9}m on grain-boundary particles at or near the time of their nucleation is beyond the resolution of any present experimental technique. Therefore, cavity nucleation measurements having a size resolution at 10^{-7}m in crept 304 stainless steel reflect the kinetics of cavity growth rather than cavity nucleation. 14 figures, 4 tables.

33996 **Some analytical use of STEM for study of oxidation on metals.** Watari, F. (Arizona State Univ., Tempe). pp 279-282 of Microbeam analysis. Geiss, R.H. (ed.). San Francisco, CA; San Francisco Press, Inc. (1981). Contract AC02-76ER02995.

Results of scanning-transmission electron microscopy (STEM) studies of the surface oxide layer formed on metals at ambient temperature are presented. Qualitative studies were carried out on the oxidation of in-situ evaporated specimens of Cu and Fe; while samples of Cr, Fe, and Fe-Cr were prepared for quantitative studies by evaporation outside the microscope. Microdiffraction studies of the samples prepared in the different ways indicated that specimen thickness was not always uniform for samples prepared in-situ, and this places serious restrictions on the use of data from this type sample. With the presently used combination of microscope techniques, quantitative use of peaks in the energy loss spectra is limited to specimen with a certain range of thickness and therefore to samples prepared outside the microscope. (BLM)

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 33009, 33182, 33689, 33947, 34079, 34863

33997 **(N—8230375) The metallurgical structure and mechanical properties at low temperature of Nitronic 40 with particular reference to its use in the construction of models for cryogenic wind tunnels.** Wigley, D.A. (Southampton Univ. (UK)). Apr 1982. 66p. (NASA-CR—165907). NTIS, PC A04/MF A01.

Nitronic 40 was chosen for the construction of Pathfinder I, an R and D model for use in the National Transonic Facility, because of its good mechanical properties at cryogenic temperatures. Nitronic 40 contains delta ferrite and is in a sensitized condition. Heat treatments carried out to remove residual stresses also caused further sensitization. Experiments showed that heat treatment followed by cryoquenching removed the sensitization without creating residual stresses. Heat treatment at temperatures of 2200 F was used to remove the delta ferrite but with little success and at the cost of massive grain growth. The implications of using degraded Nitronic 40 for cryogenic wind tunnel models are discussed, together with possible acceptance criteria.

33998 **(N—8230551) Thermoelectric refrigeration for temperatures below 100 K: A study of titanium sesquioxide.** Redebaugh, R.; Linenberger, D.; Spellicy, E. (National Bureau of Standards, Washington, DC (USA)). May 1982. 14p. (NASA-CR—166343). NTIS, PC A02/MF A01.

Previous measurements of the specific heat of V-doped Ti_2O_3 at low temperatures were explained by a model which also suggested the material would have a high thermoelectric figure-of-merit. The sample preparation, experimental apparatus, and the results of measurements on the thermal conductivity, thermoelectric power, and electrical resistivity of a single crystal Ti_2O_3 - 4% V sample are described. The results are used to derive the thermoelectric figure-of-merit between 5 and 300 K. The figure-of-merit is much smaller than expected and of little practical value because of the very high phonon thermal conductivity.

33999 **(UCRL-Trans—11857) Study of Cu-Be alloys in the vicinity of the eutectoid composition.** Auvray, X. (Lawrence Livermore National Lab., CA (USA)). May 1983. Contract W-7405-ENG-48. A; Sc.D. Thesis, 1977, University of Rouen, France. 9p. NTIS, PC A02/MF A01. Order Number DE83011639.

A study of the decomposition of the β phase in Cu-Be has been conducted with alloys of Be content between 4.5 and 11 wt% Be. Depending on the quenching rate, several different structural states can be obtained, corresponding to successive stages of the decomposition of β. The β phase can never be retained in the completely disordered state, no matter what the quenching rate and alloy composition.

34000 **Electronic energy band structure of UH_3.** Switendick, A.C. (Sandia National Labs., Albuquerque, NM (USA)). *Journal of the Less-Common Metals;* 88: No. 2, 257-262(Dec 1982).

From International symposium on the properties and applications of metal hydrides; Toba (Japan) (30 May - 4 Jun 1982).

The electronic energy bands of α- and β-UH_3 have been calculated. These systems are unique among hydride formers in that a transformation directly to a trihydride occurs without an intervening dihydride phase and in that two trihydride structures form, both of which are based on the A15 (V_3Si) structure. Evidence is found of a fairly large bonding interaction between U f electrons and H s electrons, which is allowed and favored by these structures. β-UH_3 has eight formula units in the unit cell with the hydrogen atoms tetrahedrally coordinated. As usual there is a low-lying set (24) of hydrogen-derived states which overlaps the U f levels. This leads to the result of two types of f character: localized (magnetic) and itinerant. The itinerant type may be as large as one electron per uranium atom with a greater contribution from the "linear chain" atoms which form three of the four hydrogen neighbors than from the b.c.c.-like uranium atoms. This makes the localized contribution more consistent with f^1 and agrees more with the observed moment, 1.18 μsub(B), that that expected for U^{4+} f^2.

34001 **Heat capacities of LaDsub(x) (2.5 <= x <= 3) from 1 to 300 K.** Ito, T.; Beaudry, B.J.; Gschneidner, K.A. Jr. (Ames Lab., IA (USA)). *Journal of the Less-Common Metals;* 88: No. 2, 425-430(Dec 1982).

From International symposium on the properties and applications of metal hydrides; Toba (Japan) (30 May - 4 Jun 1982).

The heat capacities of LaDsub(x) (2.5 <= x <= 3) were measured in the temperature range from 1 to 300 K. Four sharp

heat capacity peaks were found in LaDsub(3.0) at 211, 230.5, 233.5 and 274 K indicating the existence of five polymorphic forms. Only one sharp heat capacity peak was observed at 251 K for LaDsub(2.91) and LaDsub(2.76), while no peaks were observed in the heat capacity of LaDsub(2.53). The electronic specific heat constant γ was found to be zero for LaDsub(x) ($2.76 <= x <= 3$), indicating that at low temperatures these alloys are semiconductors or semimetals with a small number of conduction electrons. The non-zero γ value for LaDsub(2.53) indicates the existence of a few conduction electrons. The thermodynamic functions Ssub(298.15)° and (Hsub(298.15)°-H_0°)/T were determined.

34002 **Coatings for elevated temperature wear resistance.** Stiglich, J.J.; Holzl, R.A. (San Fernando Labs., Pacoima, CA). pp 232-262 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

San Fernando Laboratories has been solving problems by applying protective coatings using chemical vapor deposition technology for more than 20 years. In the present paper we attempt a description of some coating materials and processes which are available to the engineer concerned with abrasive wear at elevated temperatures. Following this general review, some specific examples will be given of coating substrate systems being developed currently. Finally, some comments will be made about coating costs, problems, and questions to be answered in future development efforts. 10 figures, 7 tables.

34003 **Abrasion in multiphase alloys.** Fiore, N.F. (Cabot Corp., Boston, MA); Antony, K.C.; Kosel, T.H. pp 266-294 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AC02-77ET10460.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

The current state of knowledge regarding abrasive wear of multi-phase alloys, including the most commonly employed abrasion-resistant alloys, is surveyed. Existing theories of abrasion and their inability to predict certain abrasion resistance trends are discussed. For instance, the effects of microstructural variables such as carbide size and volume fraction are not accounted for by theory. Changes in abrasion-resistance trends are included in the discussion of the various aspects of matrix and second-phase particles which affect abrasion resistance. Finally, the use of various hardfacing alloys to achieve abrasion resistance is discussed and illustrated with examples. 14 figures.

34004 **Wear of refractories in slagging gasifiers.** Bakker, W.T. (Electric Power Research Inst., Palo Alto, CA). pp 377-400 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Wear of refractories in slagging occurs through dissolution of the refractory in molten coal slag. Laboratory experiments and thermo-dynamical data indicate that refractories with a high Cr_2O_3 content are the most resistant to dissolution. The Cr_2O_3 can be present either combined with MgO as a spinel ($MgCr_2O_4$) or in solid solution with Al_2O_3. The rate of wear is not only dependent on the chemical stability of the refractory but also on its physical properties, especially porosity and permeability, thermal gradients and thermal stresses in the refractory lining and the viscosity and rate of flow of the slag. The oxygen partial pressure in the gasifier and dissolution of refractory in the slag can affect the viscosity of the slag significantly and thus affect gasifier operation adversely. Thermal gradients control the depth of penetration of the slag into the refractory, while thermal stresses can cause creep, especially in refractories penetrated by slag. In extreme cases this can lead to creep cracking which results in very rapid wear. 13 figures.

34005 **Thermal barrier coatings.** Levine, S.R. (NASA Lewis Research Center, Cleveland, OH). pp 561-582 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—). Contract AI01-77ET13111;AI01-77ET10350.

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Ceramic coatings can provide effective thermal insulation for cooled heat engine components. The future use of these coatings in the turbine sections of aircraft and electric utility gas turbine engines can provide significant gains in efficiency or durability. In this paper, the status of thermal barrier coating technology is reviewed with emphasis on utility gas turbines. The major research thrusts are: modeling of coating thermo-mechanical behavior, understanding coating adherence and degradation mechanisms in clean and dirty combustion gases, understanding the phase stability and properties of the coating materials, improving coating strain tolerance through structure modification, and improving plasma spray coating technology. In addition, engine evaluations are being used to augment laboratory experience.

34006 **Chemical properties of anion vacancies on zinc oxide.** Cheng, W.H.; Kung, H.H. (Northwestern Univ., Evanston, IL). *Surface Science;* **102**: L21-L28(1981).

A ZnO(404'1) surface, which is a stepped [4(101'0) x (0001)] surface containing a high density of anion vacancies was prepared. When compared with the nonpolar (101'0) surface, the (404'1) surface adsorbed O_2 and methanol more strongly, but CO_2 more weakly. The decomposition products of methanol were different on these two surfaces.

34007 **Characterization of an iron boride coating produced by pack boronization of low carbon steel.** St. John, M.R.; Sammells, A.F. (Inst. of Gas Tech., Chicago, IL). *Journal of Materials Science;* **16**: 2327-2329(1981).

The iron boride conversion coating was produced by peak boronization using a pack mixture composed of 20 mol % B_4C, boron compound; 5 mol % KBF_4, activator; and 75 mol % graphite, filler. The samples were heated at 960 +- 10°C for 1 to 5 h, and changes in surface composition was followed by powder x-ray diffraction. Coating thickness was monitored by optical microscopy of polished cross sections. The characteristic dentate structure of iron boride coatings on low carbon steel reported in the literature was evident, but the coating depth was ill-defined. The procedure was deemed suitable for preparation of coatings with a mixed composition of FeB and Fe_2B and with coating thickness in the range of 0.050 to 0.100 mm where the presence of graphite can be tolerated. (BLM)

34008 **Surface cation ratios of binary oxide solid solutions.** Liu, S.Y.; Kung, H.H. (Northwestern Univ., Evanston, IL). *Surface Science;* **110**: 504-522(1981).

The cation ratios in the (100) surface of cubic oxides of bulk composition $A_{0.89}B_{0.11}O$, in which A and B are divalent cations were calculated using a monolayer model. Divalent cations including Ni, Co, Mn, Fe and Mg were studied. The cations were represented by a shell model, and the surface compositions were calculated by minimizing the total Gibbs free energy of the solid. The bulk energy change on surface segregation was evaluated by minimizing the energy change on substituting one bulk cation by another in an infinitely dilute solid solution and the surface energy was evaluated by a statistical method to accommodate the possibility that both cations can exist at non-negligible densities at the surface. The bulk energy change on surface segregation was found to be dominant in most cases. The surface energy change, the entropy change, and the change in crystal field stabilization energy were all secondary. Thus, except when the difference in ionic radii is very small, the larger cation is always more preferred at the surface. This conclusion appears to be in agreement with available experimental data. 1 figure, 10 tables.

3603 Composite Materials

REFER ALSO TO CITATION(S) 33605

34009 **(CONF-830437—2) Low-speed sliding damage in TiB_2-Ni composites.** Yust, C.S. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83012093.

From ASME international conference on wear of materials; Reston, VA, USA (11 Apr 1983).

The sliding wear tracks formed on a titanium diboride-nickel composite by a titanium diboride-nickel stylus and a diamond stylus have been studied by optical and electron microscopy. Surface examination by reflected light and scanning electron microscopy reveals that an adhesive material-transfer mechanism is operative when titanium diboride slides on itself. The diamond stylus deforms the surface without material transfer and causes the disintegration of individual surface grains within the wear track. Subsurface examination of a diamond wear track by transmission electron microscopy confirms that grains are deformed by the stylus. Slip occurs within the grains on both prism and pyramidal slip planes and accumulates into large dislocation densities at the center of the wear track. Lattice misorientation accompanies the dislocation buildup and may be related to grain disintegration.

34010 **(N—8230336) High temperature composites. Status and future directions.** Signorelli, R.A. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1982. 25p. (CONF-821023—2). NTIS, PC A02/MF A01.

From 4. international conference on composite materials; Tokyo, Japan (24 Oct 1982).

A summary of research investigations of manufacturing methods, fabrication methods, and testing of high temperature composites for use in gas turbine engines is presented. Ceramic/ceramic, ceramic/metal, and metal/metal composites are considered. Directional solidification of superalloys and eutectic alloys, fiber reinforced metal and ceramic composites, ceramic fibers and whiskers, refractory coatings, metal fiber/metal composites, matrix metal selection, and the preparation of test specimens are discussed.

34011 **(N—8230338) Design Allowables Test program, Celion 3000/PMR-15 and Celion 6000/PMR-15, graphite/polyimide composites. Final Report.** Cushman, J.B.; Mccleskey, S.F. (Boeing Co., Seattle, WA (USA)). Jun 1982. 206p. (NASA-CR—165840). NTIS, PC A10/MF A01.

A design allowables test program was conducted on Celion 3000/PRM-15 and Celion 6000/PMR-15 graphite/polyimide composite to establish material performance over a 116 K (-250 F) to 589 K (600 F) temperature range. Effects of aging, thermal cycling and moisture were also evaluated. Tension, compression and in plane shear properties were determined for uniaxial, pseudoisotropic and +45 laminates. Test results show sufficient strength and stiffness to substantiate graphite/polyimide composites as an acceptable structural material for high temperature structural applications.

34012 **Metallurgy of continuous filamentary A15 superconductors.** Suenaga, M. (Brookhaven National Lab., Upton, NY). pp 201-274 of Superconductor materials science. Foner, S.; Schwartz, B.B. (eds.). New York, NY; Plenum Publishing Corp. (1981).

Composite superconductors, which consist of fine filaments of superconductors in normal metals, have gained almost universal acceptance in magnet construction. Originally the superconducting materials used in these composites were restricted to the ductile superconducting alloys, mainly Nb-Ti. However, owing to a need for improvements in the design of magnets for superconducting synchrotrons and for magnetic fusion reactors, metallurgical methods for producing such filamentary conductors with brittle A15 structured superconductors were developed in the past few years. In 1969-1970, a method for fabricating such conductors with Nb_3Ga and V_3Ga and was successfully developed and is now called the bronze process. The method relies on the fact that these A15 compounds can be formed at the interface of Nb(V) and Cu-Sn(Ga) when such composites are heated at elevated temperatures. Since the discovery of the "bronze process", many small-scale magnets have been successfully fabricated. Large-scale applications of these materials to magnets for magnetic fusion reactors and high-energy accelerators are being designed and tested. The metallurgical principles, which are involved in the process, are described including the kinetics of the compound growth, the effects of additives on the growth, etc. The superconducting properties of these compounds are also reviewed. In particular, the influence of metallurgical variables on the superconducting properties is examined in detail.In discussing the superconducting current densities in these compounds, limits in applicability of existing magnetic-flux-pinning models are also treated as well as methods for determining critical magnetic fields.

3604 Polymers And Plastics

REFER ALSO TO CITATION(S) 33026, 33649

34013 **(BNL—32651) Electrical conductivity of doped polyacrylonitrile (PAN).** Teoh, H.; MacInnes, D.; Metz, P.D. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 7p. (CONF-821229—2). NTIS, PC A02/MF A01. Order Number DE83012076.

From Colliquium on physics and chemistry of synthetic and organic metals; Les Arcs, France (14 Dec 1982).

The electrical conductivity and optical absorption spectra of halogen doped PAN have been investigated. When films of PAN previously heated in vacuum to 280°C are exposed to bromine or iodine vapor the conductivity rises suddenly. The conductivity is reduced by pumping off the vapor, but upon subsequent reheating the conductivity increases dramatically, with a transition occurring at about 270°C. Undoped samples were previously reported to undergo a similar transition above 390°C. All samples obey $\sigma \alpha$ T/ sup -1/4/ behavior, suggesting 3-dimensional variable range hopping as the conduction mechanism. The optical and infrared absorption spectra of doped PAN are compared to those previously reported for the undoped material. The stability of doped PAN in air is also discussed. 7 figures.

34014 (CONF-820331—, pp 322-326) **Deterioration of epoxy mold insulations due to voltage endurance.** Honda, M.; Aoyagi, H.; Koya, M.; Kobayashi, N.; Menju, S. (Toshiba Corp., Kawasaki, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper describes experiments to determine the cause of epoxy mold insulation breakdown under sustained applied voltage. It can be readily understood that epoxy mold insulations, which are widely used as solid insulation in gas insulated switchgear, break down under sustained applied voltage when the mold insulations contain significantly large voids. The working electrical life of such insulation can be expressed as a gradient plotted against sustained applied voltage. However, epoxy mold insulations which are practically void-free also deteriorate under sustained applied voltage. The experiments described in this paper show that the deterioration is caused by small discharges occurring in the minute space at the embedded electrode/epoxy resin interface.

34015 **(DP-MS—82-54) Effects of tritium in elastomers.** Zapp, P.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1982. Contract AC09-76SR00001. 12p. (CONF-821038—10). NTIS, PC A02/MF A01. Order Number DE83010592.

From 10. annual DOE compatibility conference; Albuquerque, NM, USA (26 Oct 1982).

Elastomers are used as flange gaskets in the piping system of the Savannah River Plant tritium facilities. A number of elastomers is being examined to identify those compounds more radiation-resistant than the currently specified Buna-N rubber and to study the mechanism of tritium radiation damage. Radiation resistance is evaluated by compression set tests on specimens exposed to about 1 atm tritium for several months. Initial results show that ethylene-propylene rubber and three fluoroelastomers are superior to Buna-N. Offgassing measurements and autoradiography show that retained surface absorption of tritium varies by more than an order of magnitude among the different elastomer compounds. Therefore, tritium solubility and/or exchange may have a role in addition to that of

chemical structure in the damage process. Ongoing studies of the mechanism of radiation damage include: (1) tritium absorption kinetics, (2) mass spectroscopy of radiolytic products, and (3) infrared spectroscopy.

34016 **(N—8231446) Positron lifetime studies in thermoplastic polyimide test specimens.** Singh, J.J.; Stclair, T.L.; Holt, W.H.; Mock, W. Jr. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). Jul 1982. 14p. (NASA-TM—84532). NTIS, PC A02/MF A01.

Positron lifetime measurements were made in two thermoplastic polyimide materials recently developed at Langley. The long component lifetime values in polyimidesulfone samples are 847 + or - 81 Ps (dry) and 764 + or - 91 Ps (saturated). The corresponding values in LARC thermoplastic imides are 1080 + or - 139 Ps (dry) and 711 + or - 96 Ps (saturated). Clearly, the presence of moisture has greater effect on positron lifetime in LARC thermoplastic imides than in the case of polyimidesulfones. This result is consistent with the photomicrographic observations made on frozen water saturated specimens of these materials.

34017 **(SAND—82-2364) Silicone encapsulant development for fireset applications.** Sayre, J.A.; Curro, J.G.; Paulsen, L.L. (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 15p. NTIS, PC A02/MF A01. Order Number DE83011845.

Purpose of this program is to formulate an encapsulant which is acceptable from a nuclear-safety standpoint, and can be used for encapsulation of firesets. Systems based on silicone resins have the lowest conductivity at elevated temperatures of any encapsulant studied. Unfortunately, silicone resins also have relatively low tear strengths and high-thermal-expansion coefficients. Despite these limitations, we previously formulated a Sylgard 184/glass microballoon encapsulant with acceptable mechanical and thermal properties. The Sylgard 184 resin system, which is a vinyl-addition silicone manufactured by Dow Corning has the undesirable property (for fireset applications) of outgassing substantial amounts of hydrogen. In order to eliminate this undersirable feature, we have recently formulated a new material based on a vinyl-addition silicone system which is cured with a peroxide and does not outgas hydrogen. Preliminary measurements on this new system look encouraging. An acceptable cure can be achieved at 40°C; the viscosity, modulus and thermal expansion coefficient are virtually identical to the commercial Sylgard system. The tear strength, however, is about half the value of the Sylgard formulation (3.4 versus 6.4 Kj/m^2).

34018 **Properties of two-dimensional polymers.** Tobochnik, J. (Rutger-the State Univ., New Brunswick, NJ); Webman, I.; Lebowitz, J.L.; Kalos, M.H. *Macromolecules;* **15**: 549-553(1982). Contract AC02-76ER03077.

A series of Monte Carlo simulations were performed for a two-dimensional polymer chain with monomers interacting via a Lennard-Jones potential. An analysis of a mean field theory, based on approximating the free energy as the sum of an elastic part and a fluid part, shows that in two dimensions there is a sharp collapse transition, at $T = \Theta$, but that there is no ideal or quasi-ideal behavior at the transition as there is in three dimensions. The simulations and mean field theory agree very well. While the simulations are not sensitive enough to extract precise values for the exponent nu, it is clear that it is close to the Flory values: $nu = 3/4$, $T > \Theta$; $nu = 1/2$, $T < \Theta$. The mean field theory also gives $nu = 2/3$ at $T = \Theta$.

3606 Other Materials

REFER ALSO TO CITATION(S) 33017, 33017, 33185, 33218, 33219, 33324, 33326, 33631, 33632, 33633, 33640, 33640, 33646, 33649, 33685, 34246, 34699

34019 **(BMFT-FB-T—83-027) Silicon material development for terrestrial solar cells.** Sirtl, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1983. 79p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750870.

Portions are illegible in microfiche products.

Under economic aspects adopted from the ERDA/DOE program of the USA a consistent material project on the basis of a "multicrystalline" silicon has been initiated. It is composed from three entirely unconventional technical branches: Refining of metallurgical-grade silicon via hydro- and pyrometallurgical processes, preparation of square-shaped ingots by (inert) gas-protected or open-hearth casting methods, and high-speed slicing on the principle of a multiple-blade slurry saw. With the construction of different second-generation pilot equipments the so-called phase of exploration came to an end. As alternative methods the aluminothermic reduction of quartz sand into silicon and the foil casting process were able to pass the laboratory scale. In material diagnostics support was given by subcontracting with MPIF, IAF, and IFT.

34020 **(CONF-820331—) Gaseous dielectrics III.** Christophorou, L.G. (ed.). (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 584p. NTIS, PC A25/MF A01. Order Number DE83006090.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Portions are illegible in microfiche products.

Topics covered at the conference include: basic physics of gaseous dielectrics; basic mechanisms of pre-breakdown; basic mechanisms of breakdown; new gaseous dielectrics; impulse breakdown; time lags and V-t characteristics; surface flashover; decomposition, aging, and bioenvironmental effects; standards and testing; and gas-insulated equipment. Abstracts of individual items from the conference were prepared separately. (GHT)

34021 (CONF-820331—, pp 77-85) **Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures.** Korasli, C.; Farish, O. (Strathclyde Univ., Glasgow, Scotland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The paper reports the results of a study of corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures. As was previously found for point-plane geometry, the corona-stabilization process is due to the space charge produced by glow and streamer corona, while the transition to corona-free breakdown is associated with the appearance of a leader-type discharge in the prebreakdown corona. Measurements of the space-charge-modified field at the outer cylinder are in good agreement with calculations and it is found that corona-stabilized breakdown occurs when the minimum space-charge field exceeds a value which, for SF_6, corresponds to $E/P \simeq 40$ to 50 kV/cm bar.

34022 (CONF-820331—, pp 86-91) **Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation.** Crichton, B.H.; Karim, N.N.A.; Blair, D.T.A. (Univ. of Strathclyde, Glasgow, Scotland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

We are currently investigating factors influencing the volt-time characteristics of gaseous insulation and, consequently, we are examining the basic processes of discharge initiation and propagation in SF_6 and SF_6 mixtures. The present paper reports observations of electron avalanche activity close to a small conducting projection located at the positive electrode of an otherwise uniform-field gap. These observations are analyzed to yield values of the absorption coefficient for the photons, emitted from the prebreakdown avalanches, which cause photoionization in the gas. We have obtained results for cylinder SF_6 and mixtures of SF_6 with small percentages of air and helium for pressures up to 2.2 bar.

34023 (CONF-820331—, pp 128-135) **Pressure dependence of dc breakdown voltage and current for SF_6 in the inhomogeneous field.** Vlastos, A.E. (Technical Univ. of Denmark, Lyngby). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The dc breakdown voltage and current in a coaxial cylinder configuration (outer steel cylinder diameter 85 mm) for SF_6 was studied at different gas pressures (0.01 to 0.7 MPa) and inner cylin-

drical electrode diameters (stainless steel 0.8 to 10 mm) for both positive and negative voltages. The results show: (a) for both polarities, there is a critical gas pressure above which the breakdown occurs immediately after the corona start leading to a direct breakdown, (b) the critical pressure, the breakdown voltage, and the current at breakdown for the same inner electrode diameter are higher for the negative polarity than for the positive polarity, (c) when the inner electrode diameter increases the critical pressure, the breakdown voltage, and the current at breakdown are reduced at both voltage polarities, (d) the current at breakdown for both voltage polarities reaches its maximum at a pressure which is lower than the pressure at which the breakdown voltage reaches its mixiumum prior to the critical pressure, (e) the current at breakdown reaches its maximum at the pressure where the difference between corona start voltage and breakdown voltage is the greatest, (f) for each pressure and for both voltage polarities, there is a proportionality between the current at breakdown and the difference between corona start voltage and breakdown voltage.

34024 (CONF-820331—, pp 136-140) **Dielectric strength of SF_6 in divergent field configuration.** Rohlfs, A.F.; Kennedy, W.N. (General Electric Co., Pittsfield, MA). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

As part of a program funded by the US Department of Energy and the New York State ERDA to develop a sheet wound, gas insulated power transformer it was necessary to establish performance characteristics of SF_6 in divergent fields. This paper presents the results of this investigation to determine the critical breakdown and withstand gradients of SF_6 at 45 psig in divergent fields with enhancement factors in the range of ~ 1 to 6. Voltages up to 500 kV rms sixty-hertz, 1000 kV switching impulse, and 1100 kV lightning impulse were investigated. Rounded edge disks mounted perpendicular to a ground plane were used to produce the desired fields. Edge radii were 0.25, 0.5, and 2.5 inches. Tests were made with both bare disks and disks coated with 15 mils of epoxy. The experiments were all performed above the critical pressure for the geometry used, and direct breakdown stresses agree closely with published data using smaller radii.

34025 (CONF-820331—, pp 166-173) **High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane.** Qiu, Y. (Xi'an Jiaotong Univ., China); Kuffel, E. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Breakdown strengths of gas mixtures composed of SF_6 + c-C_4F_8 + CO in various proportions have been studied under impulse and power frequency alternating voltages, using rod-sphere electrodes. The experiments were carried out over a pressure range extending from 100 to 400 kPa. In the pressure range between 350 kPa and 400 kPa, mixtures consisting of about 60% of SF_6, 40% of CO with a small amount of c-C_4F_8 (~ 1%) exhibited significantly higher dielectric strength than pure SF_6 under similar experimental conditions. The increased dielectric strengths of the mixture are attributed to electron attachment and inelastic scattering effects effective over a wider range of electron energy than in a single component gas.

34026 (CONF-820331—, pp 174-182) **Homogeneous field breakdown strength characteristics of some dielectric gases.** Biasiutti, G. (Swiss Federal Inst. of Tech. (ETH), Zurich, Switzerland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The dielectric strengths of a group of gases relevant to high-voltage insulation have been investigated under homogeneous field conditions in the pressure range from 0.1 to 2 bar. The breakdown behavior of the various compounds was tested for accordance with Paschen's rule, which was found not to apply to C_3F_8, C_2F_6 and N_2O: for a given pd, the breakdown field strength to pressure ratio increases markedly with pressure. The quantitative influence of the compressibility factor on this unusual behavior is discussed. Approximate analytical expressions for the breakdown field strength to pressure ratio E/sub B//p as function of the products of pressure times gap distance (p d) are given and compared with SF_6.

34027 (CONF-820331—, pp 210-218) **Critical avalanche size for impulse breakdown in quasi-uniform field SF_6 gaps.** Vincent, C.; Trinh, N.G. (Inst. de Recherche d'Hydro-Quebec, Varennes). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

A method of calculation has been developed for determining the average voltage-time (V-T) characteristics of quasi-uniform field gaps subjected to high impulse voltages. The method consists of evaluating the test voltage which will produce a critical electron avalanche in the gas gap, the size of which is a function of the time to breakdown. An empirical relationship determined from experimental data obtained at IREQ defines the critical avalanche size which would cause breakdown of the gap at a time T/sub f/, the measured time to flashover. Comparison of the calculated average V-T curves with experimental data for various gap configurations shows reasonable agreement. The error margin was found to be about 10 to 15% over the range of times to breakdown from 0.2 to 2.0 μs and for gas pressures up to 1.065 MPa.

34028 (CONF-820331—, pp 219-228) **Time lags in SF_6 under impulse conditions.** Berger, G. (Centre National de la Recherche Scientifique, Gif-sur-Yvette, France); Gayet, P.; Hutzler, B.; Jouaire, J.; Senouci, B. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Experimental results and interpretations on time lags in pure SF_6 at 1 bar are reported. Positive impulse voltages (1.2/50 μs and 6/5000 μs) were applied to a quasi-homogeneous configuration: a 4 cm long sphere-plan gap. An ageing effect is observed: as the number of shots increases, the breakdown probability decreases and the time lags become longer. After a few hundreds of shots, a stabilization occurs. This effect is due mainly to some changes in the gas state and is fairly well reproducible. For a stabilized gas, the time lag distributions were recorded under different impulse shapes and voltage levels. The results are presented as Von Laue plots and interpreted in terms of the critical volume concept. Different sources of seeds must be supposed, namely direct electron production by cosmic rays or natural radioactivity and electron detachment from negative ions. To confirm this hypothesis, some additional experiments were made, as irradiating the cathode and/or applying a permanent drift.

34029 (CONF-820331—, pp 242-243) **Positive switching impulse breakdown of sphere-plane gaps in dry and moist air.** Davies, A.J. (Univ. College of Swansea, Wales); Dutton, J.; Selim, O.; Waters, R.T. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Corona inception and sparkover voltages, as well as 50% probability of breakdown, were measured for moist and dry air for pressures ≦ 760 Torr with a newly constructed apparatus. These are presented and discussed.

34030 (CONF-820331—, pp 251-258) **Formative time lag in SF_6 and N_2.** Pfeiffer, W.; Voelker, P. (Technische Hochschule Darmstadt, Germany). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

In this contribution the influence of gas pressure, gap distance, field distribution and overvoltage on the formative time lag for approximately uniform field distribution is investigated. The measurements were performed both in N_2 and in SF_6. The main result is that the electron attachment in SF_6 becomes ineffective for higher overvoltages. It is also shown that a simple calculation of the formative time lag is not possible, which is especially true for SF_6.

34031 (CONF-820331—, pp 267-275) **Statistical time-lag to spark breakdown in high pressure SF_6.** Somerville, I.C.; Tedford, D.J. (Univ. of Strathclyde, Glasgow, Scotland). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper reports measurements of the statistical time-lag to breakdown in compressed SF_6 with coaxial cylinder geometry. The results clearly show that, with positive impulse voltages applied to the inner electrode, the measured statistical time-lag is dependent on the concentration of negative ions present in the test gap prior to the application of the impulse. From these results it is concluded that the dominant source of initiatory electrons is provided by detachment from negative ions.

34032 (CONF-820331—, pp 276-284) **Statistical voltage-time curves of an SF_6-insulated coaxial-cylinder gap.** Eteiba, M.; Rizk, F.A.M. (Inst. de Recherche d'Hydro-Quebec, Varennes). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper reports on systematic measurements of voltage-time curves of a 25/70-mm coaxial-cylinder SF_6 gap. Tests were carried out with 0.5/50-μs and 1.2/50-μs voltage impulses, for SF_6 pressures in the range 0.1 to 0.3 MPa. Times to breakdown were measured in the range of 0.2 to 7.0 μs, paying due attention to the random nature of breakdown delay and its principle components, namely the statistical and formative time lags. Gas pressure, voltage polarity and field concentrqation due to the presence of spherical particle attached tp the high-voltage electrode were systematically investigated with respect to their effects on breakdown delays. The results of this study could be significant from the point of view of the insulation coordination of gas-insulated systems.

34033 (CONF-820331—, pp 285-292) **Voltage-time characteristic of particle-initiated breakdown in SF_6 gas.** Ishikawa, M. (Tokyo Electric Power Co., Inc., Japan); Hattori, T.; Honda, M.; Aoyagi, H.; Terasaka, K. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper describes experiments which were conducted to determine the relationship between ac breakdown voltage and time to breakdown (V-t characteristics) when conducting particles are present in SF_6 gas. The experimental results indicate that: (1) Time dependence of ac breakdown voltage under contaminated conditions is a little more than that under uncontaminated conditions. (2) V-t characteristics under contaminated conditions depend on the length of the particle and the gas pressure. (3) The presence of an insulator makes no significant difference.

34034 (CONF-820331—, pp 293-299) **Influence of particulate matter on the breakdown of large sphere-gaps.** Allibone, T.E.; Saunderson, J.C. (City Univ., London, England). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The erratic behavior of large sphere-gaps stressed with dc voltages has been proved to be due to atmospheric dust which becomes charged and traverses the gap, sometimes oscillating therein, and building up whiskers on the surface. If blown by a strong cross-wind these are dispersed and the gap behaves almost as perfectly as on ac. The breakdown mechanism is very complicated; it is preceded by an enormous volume of corona channels spread over a wide area until finally one or more leader-strokes cross the gap.

34035 (CONF-820331—, pp 300-306) **Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus.** Lundgaard, L. (Norwegian Research Inst. of Electricity Supply, Trondheim); Hegerberg, R.; Kulsetas, J.; Rein, A. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

We have investigated the use of ultrasonic detectors in the frequency range 0.05 to 1 MHz to detect the occurrence of free moving particles and partial discharges inside gas-insulated high voltage equipment. The high frequency range was chosen to obtain a high immunity to externally generated noise. The results show that oscillating particles can be detected with very high sensitivity, while the method is less sensitive to partial discharges, in particular to those occurring on the central conductor or on the insulating spacers. The high damping of the high frequency ultrasonic waves in the enclosures hampers the possibility of observing remotely located irregularities, but it also eases the location if they are observed.

34036 (CONF-820331—, pp 315-321) **Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects.** Rein, A. (Norwegian Inst. of Tech., Trondheim); Kulsetas, J. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Results from breakdown tests using lightning and switching impulses in SF_6 and SF_6/N_2 mixtures are presented. The pressure range of practical interest is 0.5 to 1.5 MPa. Most of the results are given for a 50/50% SF_6/N_2 mixture at 1.0 MPa total pressure which has about 85% of the dielectric strength of pure SF_6 at 1.0 MPa, but has a substantial lower cost and a lower condensation temperature. The main emphasis is put on the effect of dielectric covering of the electrodes, both on breakdown gradients and polarity effects. Dielectric-covered electrodes give an increased breakdown field strength over that for bare electrodes, thus reaching the ultimate breakdown strength of the gas, (E/p)/sub lim/, in some cases. The breakdown field strength at the cathode has been a parameter of special interest since field emission is assumed to take place at these high field strengths.

34037 (CONF-820331—, pp 327-331) **Influence of the nature of electrode material on the production of corrosive species in a corona discharge.** Goldman, M.; Lecuiller, M.; Palierne, M. (Centre National de la Recherche Scientifique, Gif-sur-Yvette, France). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The effect on ozone production of the nature of the point in a corona discharge operated in air betwen a point and a plane has been investigated. This production depends strongly on the nature of the point material: in dry air, it can be increased by a factor of 3 when gold is used in place of copper or stainless steel. As this effect occurs only in those discharge regimes for which ionization and excitation occur near the point, a heterogeneous catalytic effect can explain the difference.

34038 (CONF-820331—, pp 410-419) **Thermal decomposition of SF_6 and SF_6-air mixtures in substation environments.** Chu, F.Y.; Massey, R.E. (Ontario Hydro, Toronto). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Thermal decomposition of SF_6 in contact with hot metallic surfaces has been previously investigated and the decomposition mechanisms are well known. This paper describes thermal decomposition of SF_6 and SF_6-air mixtures under practical conditions usually encountered in indoor gas-insulated substations. Dissociation of SF_6 under arc welding, propane heating and cigarette smoking conditions has been investigated and analytical techniques for the measurement of decomposition by-product concentrations down to 1 μL/L are discussed.

34039 (CONF-820331—, pp 433-438) **Study on metal fluoride products formation caused by the electric arc in SF_6.** Lampe, J. (Inst. of Precision Mechanics, Warsaw, Poland); Latour-Slowikowska, H.; Slowikowski, J. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

From among the phenomena accompanying electric arc discharges in SF_6 attention is paid to the formation of powder products. It is stated that the latter are formed outside the gap area between electrodes and that they are, in the first place, produced by reactions between the most active SF_6 decomposition products and the vapors of electrode metals. The process of powder formation is, moreover, affected by the presence of other materials in the reaction area as well as by the gas contamination.

34040 (CONF-820331—, pp 517-521) **Partial discharge and breakdown studies in model gas transformer windings.** Atkins, J.M. (General Electric Co., Schenectady, NY); DeVre, M.W.; Reed, C.W.; Kennedy, W.N. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

New concepts for a gas-insulated power transformer include a very compact winding construction, comprised of sheet conductor insulated with polymer film and impregnated with SF_6 gas. 60 Hz partial discharge and breakdown studies on models built with this construction have examined the effects of time of voltage application and the use of a winding edge fill (potentially useful to improve mechanical performance). Favorable voltage endurance considerably above discharge inception is found. As anticipated, the use of an edge fill results in some sacrifice in electrical properties.

34041 (CONF-820331—, pp 533-543) **SF_6 thermophysical properties: engineering approach.** Bortnik, I.M. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The results of accurate experiments and strict theoretical approaches to determine the thermophysical properties of SF_6 were analyzed. The results of this analysis show that the thermophysical properties of SF_6 at densities less than 100 kg/m^3 for temperature range 230 K to 1200 K follow with acceptable accuracy either the ideal gas laws or the state equation in which two body interaction of gas molecules or the second virial coefficient only may be taken into account. At higher temperatures the complexity in calculating the thermophysical properties of SF_6 is connected with dissociation and then ionization of molecules. Accurate calculations for this case have been performed. It should be mentioned that, for this temperature range, it is also appropriate to use the ideal gas laws, but due account should be taken of the change in the composition of the gas. For example, the adiabatic power factor value approaches 5/2R: 3/2R = 1.67 after almost complete dissociation of SF_6 molecule, but before the start of electronic excitation. It was concluded that analytical expressions can be suggested, which approximate the pressure and temperature dependences of the thermophysical properties of SF_6 for a range of parameters applicable for most electrotechnical calculations with adequate accuracy.

34042 (CONF-821185—1) **Effect of radiolysis on leachability of plutonium and americium from 76-101 glass.** Nash, K.L.; Fried, S.; Friedman, A.M.; Susak, N.; Rickert, P.; Sullivan, J.C.; Karim, D.P.; Lam, D.J. (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 6p. NTIS, PC A02/MF A01. Order Number DE83010561.

From Materials Research Society annual meeting; Boston, MA, USA (16 Nov 1982).

One aspect of the leachability of actinide-bearing glass which has not been adequately addressed is the effect of radiolysis of the system (glass-water) on the amount of actinides liberated from the glass. In the present study, we have investigated the leaching of plutonium and americium from 76-101 glass samples (containing 2 mole % plutonium) in the presence of a one megaRad/hour gamma-radiation field. The presence of the radiation field was found to increase the leaching rate of both plutonium and americium by a factor of five. Speciation studies of the plutonium in the leachate indicate that the plutonium is present predominantly in the higher oxidation states, Pu(V) and Pu(VI) and that it is significantly associated with colloidal particles. Examination of the glass surfaces with x-ray photoemission spectroscopy, XPS, both before and after leaching was carried out; these studies showed lower surface concentrations of plutonium in the samples of glass leached in the radiation field. 1 figure, 3 tables.

34043 (DPST—78-150-2) **Gas production from alpha radiolysis of concrete containing TRU incinerator ash. Progress report 2, August 1-November 30, 1978.** Bibler, N.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Apr 1979. Contract AC09-76SR00001. 34p. NTIS, PC A03/MF A01. Order Number DE83011266.

Portions are illegible in microfiche products.

This is the second progress report describing work in an experimental program to measure H_2 production from alphas radiolysis of concrete. Concrete is a candidate material for solidification of radioactive ash from incineration of laboratory wastes contaminated with transuranic isotopes. Tests described here were performed with concrete and simulated ash doped with ^{238}Pu. The results indicate that the rate of H_2 evolution [$G(H_2)$] does not significantly change when temperatures vary from 22 to 100°C. Also, $G(H_2)$ can be reduced by addition of NO_3^- or NO_2^- ions to the concrete and by heat removal of water from the concrete. H_2 evolution rates from 70 to 190 cm^3 (STP)/year for each curie of alpha activity present were attained. These rates are up to 20 times lower than rates determined in the absence of these ions and published in the previous report. Tests with nonradioactive concretes and ash established that between 22 and 100°C, H_2 was produced only by radiolysis and not by thermally induced reactions.

34044 (SAND—82-2470C) **Effects of curing and aging on the triaxial properties of concrete in underground structures.** Hightower, M.M. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 4p. (CONF-830519—1). NTIS, PC A03/MF A01. Order Number DE83007276.

From Symposium on the interaction of non-nuclear munitions with structures; Colorado Springs, CO, USA (10 May 1983).

Portions are illegible in microfiche products.

To accurately predict the response of a concrete structure for a given loading condition some knowledge of shear strength and compressibility is required. Several studies have shown that these properties vary as concrete cures and ages; therefore, the response of a concrete structure changes with time. In order to address this problem, Sandia initiated a material-test program to study the curing and aging of underground concrete structures. Material properties were obtained from cores taken periodically from two underground concrete structures constructed at the Sandia Tonopah Test Range, Nevada. Results of this continuing study are presented.

34045 **Damage annealing behavior of Se implanted GaAs.** Bhattacharya, R.S.; Rai, A.K.; Pronoko, P.P. (Universal Energy Systems, Inc., Dayton, Ohio (USA)); Narayan, J. (Oak Ridge National Lab., TN (USA)); Ling, S.C. (Wright State Univ., Dayton, OH (USA)); Wilson, S.R. (Motorola, Inc., Phoenix, AZ (USA)). *Journal of Physics and Chemistry of Solids;* **44**: No. 1, 61-69(1983).

High resolution Rutherford backscattering-channeling and transmission electron microscopy have been used to investigate the annealing behavior of Se implanted Cr-doped GaAs layers. Two distinct annealing stages were observed; one at 250 deg C which is associated with amorphous zone annihilation and/or onset of solid phase epitaxial growth and the other at about 400 to 500 deg C, depending on the dose, that can be related to the dissociation of microtwins. Above 500 deg C, the residual defects are primarily dislocation loops and precipitates. The calculated number of atoms associated with the precipitates has been found to correspond closely to the number of implanted atoms, implying 100% precipitation for the cases studied in this work. This could explain the poor or nonexistent electrical activation of Se after low temperature annealing. Experiments with high purity GaAs produced the same result, as far as the observed residual damage was concerned, thus eliminating speculation about the involvement of Cr in the nucleation of microtwins. Transmission electron microscopy investigations of the amorphous-crystalline interface in the as-implanted samples failed to reveal any extended defects. In the present paper, we discuss various mechanisms that could be responsible for the formation of twins in low temperature annealed GaAs.

34046 **Study of the oxidation of graphite in liquid water for radioactive waste storage applications.** Gray, W.J. (Pacific Northwest Lab., Richland, WA (USA)). *Radioactive Waste Management and the Nuclear Fuel Cycle;* **3**: No. 2, 137-149(Dec 1982).

The reaction rates of graphite and other carbonaceous materials with liquid water have been measured. The results confirm the expected low rates and therefore demonstrate that graphite has potential for use in the isolation of radioactive wastes. It is shown that graphite reacts not with the water itself, but with dissolved oxygen. Water, however, catalyzes the reaction. Nevertheless, the reaction

rate is at least 100 times lower than any other material that has been considered for waste isolation. Some tests were performed in the presence of a high-intensity gamma-radiation field. No measurable effect on the reaction rate of graphite was detected, but radiolysis of the water was enhanced by the presence of graphite.

34047 **Phase stability and microstructural characteristics of bulk glassy CdGe/sub 1-x/Si/sub x/As_2 alloys.** Bhattacherjee, A.P.; Risbud, S.H. (Univ. of Illinois, Urbana-Champaign). *Philosophical Magazine;* **46**: No. 6, 995-1007(1982). Contract AC02-76ER01198.

Bulk glass formation, phase stability and microstructures of alloys in the pseudobinary system $CdGeAs_2$-$CdSiAs_2$ were investigated by thermal anlaysis (DSC and DTA), X-ray diffraction and analytical transmission electron microscopy (TEM and STEM). CdGe/sub 1-x/Si/sub x/As_2 alloys showed greater glass-forming tendency as Si was substituted for Ge in $CdGeAs_2$ up to $x \sim 0.45$. Glass formation was increasingly difficult in melts with $x \geq 0.5$. The best glass-forming ability of the $x \sim 0.45$ composition correlated well with a eutectic point ($x = 0.5$, $T \sim 615°C$) observed in the DTA-based liquidus data. Amorphous phase separation occurred in as-quenched glasses with $0 < x < 0.4$, and the scale of phase separation decreased from $\sim$ 40 nm in $CdGeAs_2$ to $<$ 10 nm as x approached 0.4. Vacuum heat treatments of glasses in this composition range led to coarsening of the still amorphous microstructures. For glasses with $0.5 < x < 1.0$, the as-quenched microstructures revealed very good homogeneity, but fine-scale phase decomposition ($\sim$ 10 to 15 nm) could be induced by heat treatments near the glass transition temperatures (T/sub g/). Crystallization of all the CdGe/sub 1-x/Si/sub x/As_2 glasses resulted in transformations to a polycrystalline phase assemblage with a chalcopyrite structure. 9 figures.

34048 **Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption.** Greene, E.F.; Keeley, J.T.; Pickering, M.A. (Brown Univ., Providence, RI). *Surface Science;* **120**: 103-126(1982).

Atomic beams of K, Na, Li and Tl are used to determine the work function and desorption energies for Si(111) and (100) surfaces. The (111) surface appears to go through a surface transition at ca. 1100 K. Below 1000 K, the (111) surface appears stable with a surface ionization work function phi/sub +/ = 4.80 +- 0.05 eV. The desorption of K and Na from this surface has both a first- and second-order component with activation energies for desorption of E/sub a1/ = 3.15 +- 0.15 eV, E/sub a2/ = 2.53 +- 0.10 eV for K, and E/sub a1/ = 3.47 +- 0.15 eV, E/sub a2/ = 2.39 +- 0.13 eV for Na. The second-order part of the desorption is probably due to interactions or collisions of the atoms as they move along the surface. Above 1100 K the work function decreases by 0.03 +- 0.01 eV and the desorption of K and Na from this surface is predominantly first order with E/sub a1/ = 2.35 +- 0.07 eV for K and E/sub a1/ = 2.45 +- 0.12 eV for Na. The (100) surface in the temperature range of 800 to 1550 K has phi/sub +/ = 4.67 +- 0.08 eV and a first order desorption energy E/sub a1/ = 2.54 +- 0.14 eV for K. The work functions from the thermionic emission of electrons are phi/sub e/- = 4.55 +- 0.1 and phi/sub e/- = 4.53 +- 0.1 eV for the (111) and (100) surfaces, respectively, for $T \geq 1000$ K.

34049 **Dependence of strength on particle size in graphite.** Kennedy, E.P. (Westinghouse Electric Corp., Lester, PA); Kennedy, C.R. pp 303-315 of Fracture mechanics: thirteenth conference. Roberts, R. (ed.). Philadelphia, PA; American Society for Testing and Materials (1982).

The strength-to-particle size relationship for specially fabricated graphites has been demonstrated and rationalized using fracture mechanics. In the past, similar studies have yielded empirical data using only commercially available material. Thus, experimental verification of these relationships has been difficult. However, the graphites of this study were fabricated by controlling the particle size ranges for a series of isotropic graphites. All graphites that were evaluated had a constant 1.85-g/cm^3 density. Thus, particle size was the only variable. The strength-to-particle size relationship revealed that the fracture strength was logarithmically related to initial defect size by an apparent -1/3 power. Application of Dugdale crack extension model with simple modifications accounting for nonspherical pores and variable defect concentrations explains the -1/3 power relationship. This study also considered the particle size effect on other physical properties: coefficient of thermal expansion, electrical resistivity, fracture strain, and Young's modulus. 8 figures, 3 tables.

34050 **Some problems associated with the use of small scale measurements in determining the dielectric strength of insulating gases.** Broadhurst, J.H. (Minnesota Univ., Minneapolis). pp 117-120 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

From the mid 1930 era to the present day the generation of steady high electrical potentials has facilitated research in many scientific fields. The quest for ever larger potentials has resulted in the development of large scale electrostatic machines which utilize gaseous insulating materials at high pressure. The size of these machines precludes their use as a tool to evaluate the performance of alternate dielectric gases. Recourse therefore has been made to evaluation of small scale model systems. This article discusses the problems of applying data so obtained to the full scale machine.

34051 **Structure of O_2 at 5.5 GPa and 299 K.** Schiferl, D.; Cromer, D.T.; Mills, R.L. (Los Alamos Scientific Lab., NM). *Acta Crystallographica, Section B: Structural Crystallography and Crystal Chemistry;* No. 37, 1329-1332(1981).

An exceptionally good single crystal of O_2 was produced at 5.5 GPa and 299 K through laser annealing in a Merrill-Bassett diamond-anvil high-pressure cell. Pressure was determined with the ruby fluorescence method. X-ray diffracton studies showed the unit cell to be rhombohedral with space group R3m, lattice constants a = 2.8467(2) and c = 10.2249(8) A, and three molecules per unit cell. The structure is the same as that of β-O_2 found at low temperature. It was refined to R/sub w/ = 0.050 for 39 observed intensities.

40 CHEMISTRY

4001 Analytical And Separations Chemistry

REFER ALSO TO CITATION(S) 33171, 33172, 33173, 33175, 34121, 34149, 34149, 34163, 34171, 34402, 34482

34052 **(BNL—32898) Separation of helium-methane mixtures by pressure-swing adsorption.** Cheng, H.C.; Hill, F.B. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 38p. (CONF-830308—12). NTIS, PC A03/MF A01. Order Number DE83011623.

From American Insititute of Chemical Engineers national meeting; Houston, TX, USA (27 Mar 1983).

Portions are illegible in microfiche products.

The separation of mixtures of helium and methane using a single column of activated carbon in a pressure swing adsorption process was studied experimentally. Process performance was predicted with an average error of 10% or less by a local equilibrium well-stirred cell model in which dead volumes at the feed and product ends of the column were accounted for. Systematic differences between experiment and model were ascribed to omission from the model of flow resistance and heat release. 8 figures, 1 table.

34053 **(Juel-Spez—186) Analytical chemistry in the People's Republic of China.** Liang, S.C. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung fuer Chemische Analyse). Dec 1982. 41p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750897.

Activities in the People's Republic of China in the field of analytical chemistry are reviewed, i. e. studies, universities and other institutes, their directors and fields of research, and publishers. Some applications of analytical chemistry are mentioned. The author's own publications are presented in a bibliography.

34054 **(LA-UR—83-1060) Hybrid chemical and nondestructive analysis technique.** Hsue, S.T.; Marsh, S.F.; Marks, T. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 5p. (CONF-830423—9). NTIS, PC A02/MF A01. Order Number DE83011321.

From 5. symposium on safeguards and nuclear material management; Versailles, France (19 Apr 1983).

Portions are illegible in microfiche products.

A hybrid chemical/NDA technique has been applied at the Los Alamos National Laboratory to the assay of plutonium in ion-exchange effluents. Typical effluent solutions contain low concentrations of plutonium and high concentrations of americium. A simple trioctylphosphine oxide (TOPO) separation can remove 99.9% of the americium. The organic phase that contains the separated plutonium can be accurately assayed by monitoring the uranium L x-ray intensities.

34055 **(LA-UR—83-1115) Plutonium isotopic measurement for small product samples.** Li, T.K.; Sampson, T.E.; Johnson, S.S. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 4p. (CONF-830423—10). NTIS, PC A02/MF A01. Order Number DE83011172.

From 5. symposium on safeguards and nuclear material management; Versailles, France (19 Apr 1983).

An automated at-line plutonium isotopic analysis system for small-product plutonium samples in the range of 10 to 1000 μg has been developed. The analysis is based on low-energy gamma rays at 43.48 keV (^{238}Pu), 45.23 keV (^{240}Pu), 51.63 keV (^{239}Pu), 64.83 keV (^{241}Pu-^{237}U), 129.3 keV (^{239}Pu), and 148.6 keV (^{241}Pu). Within a 20-ks counting time, we demonstrated that for plutonium masses $>$ 600 μg the precision is $<$ 0.7% for ^{238}Pu/^{239}Pu and ^{240}Pu/^{239}Pu ratios and $\sim$ 4% for the ^{241}Pu/^{239}Pu ratio. The agreement between the results measured by gamma-ray spectroscopy and those measured by mass spectrometry for seven samples is within the gamma-ray precision limits.

34056 (LBL—14986, pp 103-104) **Differential scattering of circularly polarized light by the helical sperm head from the octopus Eledone cirrhosa.** Maestre, M.F.; Bustamente, C.; Hayes, T.L.; Tinoco, I. Jr. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Circular dichroism studies of complex biological macrostructures sometimes produce anomalies in the measured spectra. Circular dichroism signals are observed outside the absorption bands of the chromophores, thus making the interpretation of the spectra difficult. We have built an instrument to measure the angular dependence of differential scattering of circularly polarized light (CIDS), and wish to report some preliminary results that indicate the usefulness of such measurements. The nuclei of sperm cells from the octopus Eledone cirrhosa were chosen for initial study, since their large helical structure ensures large CIDS values, and their chirality and dimensions could be measured independently.

34057 (LBL—14986, pp 132-134) **Calibration of the analytic ultracentrifuge.** Lindgren, F.T.; Shore, V.; Adamson, G.L.; Glines, L.A.; Kahlon, T.S. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The analysis of lipoproteins involves reproducible methods for isolation, methods for characterization, and methods for quantification. One such method is the analytical ultracentrifuge (AnUC), which provides a Schlieren pattern utilizing the invariant physical measurement of refractive increment. Such results given essentially a molecular size distribution and corresponding refractive increments and thus the concentrations among lipoprotein subfractions. With quantitative refinement in the specific refractive increments, the analytic ultracentrifuge may provide a more stable absolute standardization for lipoprotein and lipoprotein subfraction analysis. The authors have used a Beckman standard calibration wedge to routinely establish and maintain calibration, after a drive change or any manipulation or adjustment of the optical system.

34058 (LBL—14986, pp 134-136) **Plasma lipoprotein stability and standardization.** Lindgren, F.T.; Hulley, S.B.; Adamson, G.L.; Kahlon, T.S. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

With recent interest in HDL and its subfractions, there is increased need for some form of a stable lipoprotein-lipid standard. For example, in longitudinal diet and exercise studies some data may need comparison and standardization during periods of some two years or more. Thus, small drifts in the measurements of total HDL cholesterol (HDL/sub c/) and/or other lipoprotein-lipid measurements might seriously compromise valid comparison of the experimental data. The stability of frozen serum with regard to the integrity of lipoprotein patterns over a period of some two years is evaluated.

34059 **(ORNL—5949) Analytical Chemistry Division annual progress report for period ending December 31, 1982.** Lyon, W.S. (ed.). (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 88p. NTIS, PC A05/MF A01. Order Number DE83012299.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Analytical Chemistry Dvision of Oak Ridge National laboratory (ORNL) serves a multitude of functions for a clientele that exists both in and outside ORNL. These functions fall into the following general categories: (1) analytical research, development, and implementation; (2) programmatic research, development, and utilization; and (3) technical support. The Division is organized into five major sections, each of which may carry out any type of work falling in the three categories mentioned above. Chapters 1 through 5 of this report highlight progress within the five sections (analytical methodology, mass and emission spectrometry, radioactive materials, bio/organic analysis, and general and environmental analysis) during the period January 1, 1982 to December 31, 1982. A short summary introduces each chapter to indicate work scope. Information about quality assurance and safety programs is presented in Chapter 6, along with a tabulation of analyses rendered. Publications, oral presentations, professional activities, educational programs, and seminars are cited in Chapters 7 and 8. Approximately 61 articles, 32 proceedings publications and 37 reports have been published, and 107 oral presentations were given during this reporting period.

34060 **(UCID—19796) Plutonium separations.** Wild, J.F. (Lawrence Livermore National Lab., CA (USA)). 9 May 1983. Contract W-7405-ENG-48. 19p. NTIS, PC A02/MF A01. Order Number DE83012707.

The procedures presented update the 1965 monograph on the radiochemistry of plutonium. They reflect the interest in measuring plutonium concentrations in the ecosphere arising from the atmospheric nuclear weapons tests and the introduction of small amounts of Pu to the environment through the discharge of decontaminated low-level waste solutions. All except two of the nine methods described use solvent extraction, by either batch separation or column chromatography, as the main purification-concentration step. Procedures one to seven use electrodeposition followed by pulse-height analysis for the Pu determination. Procedure eight uses absorption spectrophotometry and procedure nine uses standard scintillation counting.

34061 **Sensitivity calculations for multielemental trace analysis by synchrotron radiation induced X-ray fluorescence.** Gordon, B.M. (Brookhaven National Lab., Upton, NY (USA). Dept. of Energy and Environment). *Nuclear Instruments and Methods in Physics Research;* **204**: No. 1, 223-229(15 Dec 1982).

The application of synchrotron radiation from high energy electron storage rings as an excitation source for X-ray fluorescence analysis of trace elements will greatly extend the sensitivity of the fluorescence technique. The properties of synchrotron radiation that make improvement possible are: high brightness, continuously tunable energy spectrum, relatively low energy deposition, and polarization in the storage ring plane for reduced scattering backgrounds. New wide energy bandwidth monochromators now being developed will provide intense monochromatic beams which will make practical the use of wavelength dispersive crystal spectrometers. The sensitivity calculations presented are applied to representative thin biological and geological samples. The storage ring parameters used are the design parameters of the National Synchro-

tron Light Source. The quantitation limits (sigma = 10%) for a thin biological sample using a solid state detector is less than 1 ppm for low Z elements and 1-10 ppm for high Z elements for one minute irradiations. Using fixed multicrystal wavelength dispersive spectrometers quantitation limits range from 3-30 ppb for biological samples and 30-300 ppb for geological samples. Minimum detectable limits are a factor of 3 to 5 lower.

34062 **Prompt nuclear analysis: growth and trends. A scientometric study.** Bujdoso, E.; Noszlopi, I. (Magyar Tudomanyos Akademia, Budapest); Lyon, W.S. (Oak Ridge National Lab., TN (USA)). *Journal of Radioanalytical Chemistry;* **74**: No. 1-2, 197-238(1982).

Paper copy only, copy does not permit microfiche production6 refs.

The growth of prompt nuclear analysis including Rutherford backscattering is analysed by using scientometric methods. Publication productivity, the number and kinds of nuclear reactions used, elements analyzed, manpower demography and migration and the diffusion of prompt methods are discussed.

34063 **Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis.** Rosseel, T.M.; Hulett, L.D.; Northcutt, K.J. (Oak Ridge National Lab., TN (USA)). *Journal of Radioanalytical Chemistry;* **75**: No. 1-2, 259-264(1982).

7 refs.

X-ray fluorescence, using the fundamental parameters method for matrix correction, is used routinely for quantitative analysis in our group. The accuracy of this method has been demonstrated with a Nd:YAG ($Nd:Y_3Al_5O_{12}$) laser crystal. The neodymium concentration was determined relative to the yttrium concentration by X-ray fluorescence using ^{241}Am for excitation. The yttrium-aluminium ratio was confirmed by scanning electron microscopy (SEM-EDX). Although there was a 10% discrepancy for yttrium due to the uncertainty in the neutron capture cross-section, the fluorescence results for aluminium and neodymium were in very good agreement with neutron activation analysis (NAA) results. Based on this agreement, the Nd:YAG sample will be used in future NAA calibration measurements.

34064 **Capillary column supercritical fluid chromatography/mass spectrometry.** Smith, R.D. (Pacific Northwest Lab., Richland, WA); Felix, W.D.; Fjeldsted, J.C.; Lee, M.L. *Analytical Chemistry;* **54**: No. 11, 1883-1885(1982). Contract AC06-76RL01830.

An instrument developed in the author's laboratory and incorporating a capillary column supercritical fluid chromatography (SFC), a direct fluid injection (DFI) interface, and a tandem quadrupole mass spectrometer equipped with a dual electron impact-chemical ionization ion source is described. Initial results of separations suggest excellent separations and sensitivities using the described instrument. Advantages of the capillary SFC-DFI interface are due to the low flow rates, high mobile phase volatility, and the capability for mixed chemical ionization reagents. (BLM)

34065 **Precise trace rare earth analysis by radiochemical neutron activation.** Laul, J.C.; Lepel, E.A.; Weimer, W.C.; Wogman, N.A. (Battelle Memorial Inst., Richland, WA). *Journal of Radioanalytical Chemistry;* **69**: No. 1-2, 181-196(1982). Contract AC06-76RL01830.

A rare earth group separation scheme followed by normal Ge(Li), low energy photon detector (LEPD), and Ge(Li)-NaI(Tl) coincidence-noncoincidence spectrometry significantly enhances the detection sensitivity of individual rare earth elements (REE) at or below the ppB level. Based on the selected γ-ray energies, normal Ge(Li) counting is favored for ^{140}La, ^{160}Tb and ^{169}Yb; LEPD is favored for low γ-ray energies of ^{147}Nd, ^{153}Sm, ^{166}Ho and ^{169}Yb; and noncoincidence counting is favored for ^{141}Ce, ^{145}Ce, ^{142}Pr, ^{153}Sm, ^{171}Er and ^{175}Yb. The detection of radionuclides ^{152}/sup m/Eu, ^{159}Gd and ^{177}Lu is equally sensitive by normal Ge(Li) and noncoincidence counting; ^{152}Eu is equally sensitive by LEPD and normal Ge(Li); and ^{153}Gd and ^{170}Tm is equally favored by all the counting modes. Overall, noncoincidence counting is favored for most of the REE. Precise measurements of the REE were made in geological and biological standards.

34066 **Microdetermination of aliphatic amines and polyamines with cupric ion: relationship between pK_1 and half-complexation potential.** Selig, W. (Lawrence Livermore National Lab., CA). *Microchemical Journal;* **27**: 200-209(1982). Contract W-7405-ENG-48.

In previous publications (3, 8, 9) we have reported the potentiometric microdetermiation of aliphatic amines and polyamines with cupric nitrate. Electromotive forces were monitored with a copper ion-selective electrode (ISE) and a single-junction reference electrode. In this paper we relate the first equilibrium constant, K_1, for the combination of ligand with cupric ion to be half-complexation potential, E/sub HC/, and discuss the limitations of our method. Some additional data are also presented.

34067 **Fourier transform nuclear quadrupole resonance spectroscopy.** Klainer, S.M. (Lawrence Berkeley Lab., CA); Hirschfeld, T.B.; Marino, R.A. pp 147-182 of Fourier, Hadamard, and Hilbert transforms in chemistry. Marshall, A.G. (ed.). New York, NY; Plenum Publishing Corp. (1982). Contract W-7405-ENG-48.

The interest in understanding the behavior of solids has provided an impetus for analytical techniques suitable for use with solid state systems. The need for Fourier transform-nuclear quadrupole resonance spectroscopy (FT-NQR) is demonstrated by examples. Emphasis has been directed at natural systems, such as minerals, and at military and security applications. The possibility of measuring in-situ strain is of interest in rock mechanics. A technology which can be measured both single crystals and polycrystalline materials, which can respond to contaminants or homogeneous small samples, which can operate both in the laboratory or under semi-remote conditions while providing high resolution spectral data for solid samples has the versatility to develop into an important analytical tool. FT-NQR technology has overcome many problems and shows much promise. 24 figures, 1 table.

34068 **Development of sampling and analytical method for styrene oxide.** Stampfer, J.F.; Hermes, R.E. (Los Alamos National Lab., NM). *American Industrial Hygiene Association Journal;* **42**: 699-706(Oct 1981). Contract W-7405-ENG-36.

A method is described for the collection and analysis of airborne styrene oxide. The sampler consists of a glass fiber filter followed by a sorbent, Tenax-GC. The styrene oxide is extracted from the sampler with ethyl acetate and an aliquot analyzed by gas-liquid chromatography. Recoveries of >95% were obtained from samples (0.5 to 44 μg) collected from 80% relative humidity test atmospheres. The coefficient of variation for the method, including an assumed pump error of +-5%, was 0.076. The limit of detection of the analytical method was 0.1 μg per sample. Stability and interference studies indicate the method to be suitable for personal monitoring.

34069 **Comments on column characterization: a sulfur column.** Dowell, F. (Oak Ridge National Lab., TN); Stewart, G.H. *Chromatographia;* **14**: No. 7, 421-424(Jul 1981). Contract W-7405-ENG-26.

The McReynolds' constants for liquid sulfur as a stationary phase in gas-liquid chromatography (GLC) are presented. A simple graphical method of pattern analysis is used to indicate the uniqueness of the sulfur column as compared with other stationary liquid phases characterized by McReynolds. The limitations of using a single factor (as polarity) for the basis for the selection of GLC columns is discussed.

34070 **Evaluation of quantitative precision in high performance liquid chromatography.** Aiken, R. L.; Fritz, G.T.; Marmion, D.M.; Michel, K.H.; Wolf, T. (ASTM, Philadelphia, PA). *Journal of Chromatographic Science;* **19**: 338-348(Jul 1981).

Results from a cooperative study initiated by ASTM E-19 to evaluate the quality of data to be expected from current practice of liquid chromatography are discussed. Seventy-eight laboratories participated in the program using reversed-phase columns to analyze two samples, each in triplicate. The first sample was an easily separated four-component mixture; the second was a more complex six-component mixture. Mean values of the analytical data submit-

ted were consistent with the known concentrations of the components in each sample, indicating a highly satisfactory degree of overall accuracy. However, the spread of data, expressed as percent relative standard deviation, revealed analytical problems for some laboratories. Relative standard deviations for the whole data set ranged from 6 to 11% in the first sample. The problems were more serious in the more complex sample with relative standard deviations ranging from 9 to 16%. Removal of data from outlier laboratories using a multivariate analysis of the data reduced relative standard deviations in the first sample to a range of 3 to 5% and in the second sample to a range of 3 to 8%. This latter information was representative of the performance of about 90% of the participating laboratories.

34071 **Recent advances in optimization strategies: chromatography, electrochemistry, and spectroscopy.** Laub, R.J. (Ohio State Univ., Columbus). *American Laboratory;* 47-58(Mar 1981).

The examples presented here illustrate the several advantages of the use of the window diagram strategy: a rational basis, first, is provided for representation of the independent parameter(s) to be optimized (abscissa) against those (dependent) variables arising from experiment (ordinate). The resultant straight-line plots (Figures 1a, 2a, 4a, 5a) of course need not be linear. The window diagrams constructed from these plots (Figures 1b, 2b, 4b, 5b) then provide a global set of optima (windows) from which, according to criteria established by the analyst, a value of the overall optimum independent variable(s) is chosen (thereby avoiding difficulties associated with, for example, local minima with other strategies). Furthermore, if the minimum dependent-variable values dictated by the optimum of the independent parameter(s) are for any reason not satisfactory, selective analysis comprising regions of specific interest can be performed. Even in these cases, however, the methodology offers a quantitative guide to the selection of appropriate additional experiment. Finally, the most compelling advantage of the window diagram strategy may be its simplicity, which when coupled with the attendant features noted above, leaves little question of the prospect of its broad utility in chromatography, in electrochemistry, and in spectroscopy. 5 figures, 1 table.

34072 **Quantitative determination of chrysotile in building materials.** Dunn, H.W.; Stewart, J.H. Jr. (Oak Ridge National Lab., TN). *Microscope;* **29**: No. 1, vp(1981). Contract W-7405-ENG-26.

An analytical method has been developed for the quantitative analysis of chrysotile asbestos in building materials. The 0.5 to 5.0 wt % range was investigated although the method can be extended to higher concentrations. The nature of the specimen determines which combination of instruments will be used: polarizing optical microscope, transmission electron microscope, Debye-Scherrer x-ray diffraction camera or the x-ray diffractometer. The later method uses step scanning with a chrysotile:aspirin internal standard ratio to yield a quantitative analysis of asbestos down to 0.5%. Approximately 0.1% asbestos can be detected by extended counting times.

34073 **Quantal aspects of the spatial resolution of energy-loss measurements in electron microscopy. I. Broad-beam geometry.** Ritchie, R.H. (Oak Ridge National Lab., TN). *Philosophical Magazine, [Part] A: Defects and Mechanical Properties;* **44**: No. 4, 931-942(1981). Contract W-7405-ENG-26.

Quantal aspects of spatial resolution in combined energy-loss-electron microscopy are considered. Working in the first Born approximation, it is shown that for coherent broad-beam irradiation the probability of stimulating a localized excitation in matter may be calculated as if the electron executed classical rectilinear motion at constant velocity, v, as v becomes very large. Corrections to this expression may be expressed as a power series in inverse powers of v and may be considered to originate in the quantal properties of the electron. The first correction term is displayed explicitly. The impact-parameter dependence of excitation of some localized systems is studied numerically. 3 figures.

34074 **Simple method to enhance thermal emission of metal ions.** Smith, D.H.; Carter, J.A. (Oak Ridge National Lab., TN). *International Journal of Mass Spectrometry and Ion Physics;* **40**: 211-215(1981). Contract W-7405-ENG-26.

A simple technique has been developed to enhance ion yields from Pu and U during single-filament thermal analysis. A small amount of Re powder is slurried with a solution of sucrose in water and added to the canoe-shaped filament. Forcing the Pu or U through the resulting Re-C layer leads to enhanced ion emission and to significantly reduced fractionation.

34075 **Quantification of energy loss measurements with the use of K and L absorption edges.** Sklad, P.S. (Oak Ridge National Lab., TN); Bentley, J.; Lehman, G.L. pp 173-176 of Analytical electron microscopy. Geiss, R.H. (ed.). San Francisco, CA; San Francisco Press, Inc. (1981). Contract W-7405-ENG-26.

From Proceedings of a workshop on analytical electron microscopy; Vail, CO (USA) (13-17 July 1981).

In order to investigate some incompatibility between K and L edges, a series of spectra was measured with a sample of Si_3N_4. Analyses performed with the use of integrated intensities from K edges only were compared with those obtained from Si L_{23} and N K edges. Quantification results made with Si_{23} edges showed deviations from the stoichiometric values. However, analyses that use silicon K yield a composition of 41 at 0/0 N compared to the expected 43 at 0/0 Si and 57 at 0/0 N. The results are apparently higher when L edges are used together with the K edges. 2 figures, 1 table.

34076 **Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane.** Danesi, P.R.; Vandegrift, G.F. (Argonne National Lab., IL). *Inorganic and Nuclear Chemistry Letters;* **17**: No. 3/4, 109-115(1981).

The activity coefficients of bis(2-ethylhexyl)phosphoric acid, HDEHP, in n-dodecane in the concentration range 1×10^{-3} - 1 F have been evaluated from liquid-liquid distribution studies of Eu^{+3}, Tm^{+3} and Ca^{2+}. The deviations from ideality have been interpreted in terms of solute-solute weak interactions, where the interacting solute species is the HDEHP dimer.

34077 **Phase-fluctuation optical heterodyne spectrometer as a non-destructive detector for gas chromatography.** Lin, H.B.; Gaffney, J.S.; Campillo, A.J. (Brookhaven National Lab., Upton, NY). *Journal of Chromatography;* **206**: 205-214(1981). Contract AC02-76CH00016.

A novel, selective, non-destructive gas chromatographic (GC) detector which measures the infrared (ir) absorption of the functional group of interest using a laser homodyne photothermal refractometer is described. This technique, called phase-fluctuation optical heterodyne spectroscopy (PFLOHS) has demonstrated an absorption sensitivity of $10^{-8}cm^{-1}$. In the case of SF_6, a measured detection limit of less than 1 pg of injected material was obtained. Sensitivities of ca. 0.75 pg sec^{-1} (corresponding to a flow-rate of 30 ml/min) are anticipated for materials possessing an absorption coefficient of 10 cm^{-1} atm^{-1}, which is typical of the strongest ir bands exhibited by most species. The primary utilization of GC-PFLOHS is expected in atmospheric trace-gas analysis.

34078 **Amonia gas: an improved reagent for chemical ionization mass spectrometry of bile acid methyl ester acetates.** DeMark, B.R.; Klein, P.D. (Argonne National Lab., IL). *Journal of Lipid Research;* **22**: 166-171(1981). Contract W-31-109-ENG-38.

The ammonia chemical ionization mass spectra of 28 methyl ester acetate derivatives of bile acids and related compounds have been determined by gas-liquid chromatography-mass spectrometry. Advantages of ammonia ionization over the previously studied isobutane ionization include a 130 to 270% enhancement in the sensitivity of base peak monitoring, and direct determination of molecular weight from the base peak ($M + NH_4^+$) in the mass spectrum of any of the derivatives. Minor ions in the ammonia spectra also allow selective detection of 3-keto compounds and can indicate unsaturation or double bond conjugation in the molecule. The signifi-

cance of these studies for the detection and quantitation of bile acids is discussed. 2 tables.

34079 **Limitations of AEM-based x-ray microanalysis.** Zaluzec, N.J. pp 47-53 of Analytical electron microscopy. Geiss, R.H. (ed.). San Francisco, CA; San Francisco Press, Inc. (1981).

Limitations applied to materials science investigations are discussed. 4 figures, 1 table.

34080 **Inductively coupled plasma atomic emission spectroscopy: a review.** Barnes, R.M. (Massachusetts Univ., Amherst). *Analytical Chemistry;* 1: No. 2, 51-55(1981). Contract AC02-77ER04471.

In the less than 10 years since the commercial introduction of inductively coupled plasma (ICP) instruments, ICP atomic emission spectroscopy (AES) has developed into one of the most used new analytical tools of the decade. 1 table.

34081 **Ion flotation of zinc using ethylhexadecyldimethylammonium bromide.** McDonald, C.W.; Ogunkeye, O.A. (Texas Southern Univ., Houston). *Microchemical Journal;* 26: 80-85(1981). Contract AS05-76ER04535.

Zinc ions react with the surfactant ethylhexadecyldimethylammonium bromide (EHDABr) to form a surface active sublate which can be removed from aqueous chloride solutions by ion flotation. A typical ion flotation procedure involves passing air through a 235-ml solution containing 5 ppM Zn^{2+}, 2.0 M HCl, and 2.5 x 10^{-3} M EHDABr at a flow rate of 40 ml/min for 150 min. The procedure is simple and rapid. Cadmium, copper, lead, and nickel ions cause reductions of zinc flotation efficiencies of less than 2.5% under the experimental conditions. 5 tables.

34082 **Microdetermination and pK/sub a/ measurement of some aliphatic amines using the copper-ion-selective electrode.** Hassan, S.S.M. (Ain Shams Univ., Cairo, Egypt); Tadros, F.; Selig, W. *Microchemical Journal;* 26: 426-435(1981). Contract W-7405-ENG-48.

Aliphatic amines were determined on the microscale by potentiometric titration with standard cupric sulfate solution in aqueous or partially aqueous (methanolic) medium. Electromotive forces were monitored with a copper-ion-selective electrode or a graphite rod impregnated with silver sulfide/cupric sulfide, and a double-junction reference electrode. Monoamines and diamines up to 1,3-diaminopropane reacted on a 2:1 amine:Cu basis. Diamines from 1,4-diaminobutane to at least 1,7-diaminoheptane reacted on an equimolar basis. The dissociation constants of some of the amines were determined. A linear relationship exists between the emf at half complexation and the dissociation constants of the amines tested. 2 figures, 4 tables.

34083 **Geometry of the absorption correction for analytical microscopy.** Zaluzec, N.J. (Argonne National Lab., IL). pp 325-328 of Microbeam Analysis. Geiss, R.H. (ed.). San Francisco, CA; San Francisco Press, Inc. (1981).

This paper reports on a generalization of an earlier formulation of the absorption geometry which can be employed for any x-ray detector/microscope combination; all other simplified models can be shown to be special cases of this formation. 4 figures.

34084 **Propagation of errors in quantitative AEM microanalysis by XEDS and EELS.** Zaluzec, N.J. (Argonne National Lab., IL). pp 329-332 of Microbeam Analysis. Geiss, R.H. (ed.). San Francisco, CA; San Francisco Press, Inc., (1981).

The question of propagation of errors is addressed in the context of the basic equations used during analytical electron microscope-based thin-film analysis. A general expression is derived which relates the relative error in a composition measurement to relative errors in the respective input parameters needed for quantitative x-ray energy-dispersive spectroscopy and electron energy loss spectroscopy microanalysis. Work is in progress to determine the detailed dependence of errors on the input parameters used within the respective models.

34085 **Analysis of particulates for very light elements by forward scattering of alpha particles.** Wolfe, G.W. (Univ. of Mississippi, University). *NBS Special Publication (United States);* No. 594, 516-520(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

PIXE analysis is limited to elements heavier than sodium. A technique has been developed for obtaining quantitative information about the levels of elements hydrogen through flourine by forward scattering of 18 MeV alphas, and may be obtained simultaneously with PIXE. Using substrate thicknesses less than 1 mg/cm^2, sensitivities from 2.7 $\mu g/cm^2$ for hydrogen to 124 $\mu g/cm^2$ for carbon, may be obtained after corrections, with determinations accurate to +- 15%, in 200 second irradiation times. Substantial corrections must be made.

34086 **Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases.** Laub, R.J.; Roberts, W.L.; Smith, C.A. (Ohio State Univ., Columbus). *HRC and CC, Journal of High Resolution Chromatography and Chromatography Communications;* 3: 355-356(Jul 1980). Contract AC02-80ER10554.

Preparation of the three open tubular glass capillary columns is described, as is the process for adding surface coatings with different concentrations of liquid crystal BBBBT [N,N'-bis-(p-butoxybenzylidene)-a,a'-bi-p-toluidine] and SE-52 to each of the columns. Each coating solution was degassed for 30 min, and allowed to stand for 1 h before use. The gas chromatograph was a Varian Model 3700. The column temperature was maintained at 220°C. Hydrogen was the carrier gas. The most acceptable column efficiency was achieved by and 80% SE-52 and 20% blend of the gum and liquid crystal solvents. The chromatograms show the results of the separation of anthracene, fluoranthene, pyrene, triphenylene, benzanthracene, and chrysene. 1 figure, 1 table.

4002 Inorganic And Physical Chemistry

REFER ALSO TO CITATION(S) 33180, 33267, 33277, 33988, 34075, 34149, 34151, 34160, 34168, 34170, 34174, 34176, 34187

34087 **(AD-P—000282/4) Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2.** Pamidimukkala, K.M.; Skinner, G.B. (Wright State Univ., Dayton, OH (USA). Dept. of Chemistry). Jul 1981. Contract AC02-76ER02944. 8p. NTIS, PC A02/MF A01.

Resonance absorption spectroscopy has been used to measure oxygen atom concentrations in shock heated H2-O2-Ar and D2-O2-Ar mixtures. Rich, lean and stoichiometric compositions have been studied in the temperature range 1000 - 2500 K. Under all conditions studied, the hydrogen-oxygen reaction could be adequately described by a small number of elementary reactions, and the rate constants could be deduced for several of them.

34088 **(AD-P—000284/0) Effect of minute quantities of impurities on shock tube kinetics. The reaction H_2 + D_2 yields 2HD.** Lifshitz, A.; Bidani, M.; Carroll, H.F. (Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry). Jul 1981. 8p. NTIS, PC A02/MF A01.

From Proceedings of the International Symposium on Shock tubes and Waves (13th); Niagara Falls, NY (July 6-9, 1981).

An ultra-clean 2 in I.D. single pulse shock tube coupled to an atomic resonance absorption detection system was constructed in order to determine H atom concentration by Lyman-alpha absorption. The shock tube with its LiF windows was baked to 300 C and pumped down to approx. 10 to the minus 7th power torr under this baking temperature. Ultra-pure argon could be shock heated to approx. 2500 K with no spurious H atom absorption. The system was constructed in order to study the kinetics of chemical reactions, where are strongly catalyzed by H atoms, under the conditions where no such atoms are detected.

34089 (BMFT-FB-T—82-161) Application of modern surface analytical methods for the solution of problems of technical catalysts. Hamer, E.; Inacker, O.; Plog, C.; Seidl, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 130p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750092.

A new procedure, including modern surface analytical methods, was elaborated for the development of technical heterogeneous catalysts. The procedure was developed using the reduction of NO by CO on CuO-catalysts as a model reaction. It was applied to promote iron catalysts for the ammonia synthesis. Correlations between reaction kinetic data and surface properties of the catalysts could be found, providing essential novel information about the type and quantity of active sites and the optimization of catalysts.

34090 (CONF-830419—5) Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone. Varlashkin, P.G.; Peterson, J.R. (Tennessee Univ., Knoxville (USA). Dept. of Chemistry). 1983. Contract W-7405-ENG-26. 16p. NTIS, PC A02/MF A01. Order Number DE83012098.

From 16. rare earth research conference; Tallahassee, FL, USA (18 Apr 1983).

Electrochemical and spectroscopic studies of some lanthanide salts in molten dimethyl sulfone ($DMSO_2$) at 400 K have been carried out. Differences in the $DMSO_2$ versus aqueous solution absorption spectra of trivalent Eu, Yb, and Sm and divalent Eu have been observed.

34091 (LBL—15842) Picosecond studies of vibrational linewidth broadening in liquids. George, S.M. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 270p. NTIS, PC A12/MF A01. Order Number DE83011742.

Portions are illegible in microfiche products; Thesis.

The mechanisms of vibrational linewidth broadening in liquids are investigated using picosecond light pulses. Vibrational linewidths in liquids are demonstrated to be both homogeneously and inhomogeneously broadened. The homogeneous broadening is dependent upon rapidly varying processes probably associated with short-range, repulsive collisional interactions between the vibration and neighboring molecules. On the other hand, the inhomogeneous broadening is dependent upon slowly varying, long-range attractive interactions between the vibration and the surrounding local number density. Homogeneous and inhomogeneous broadening linewidths are determined for the symmetric CH_3-stretching vibration in a variety of liquids at room temperature and in one liquid at a variety of temperatures. A selective excite-and-probe vibrational dephasing experiment based upon transient stimulated Raman scattering in high laser depletion is used to measure T_2 homogeneous vibrational dephasing times. Inhomogeneous linewidths are shown to be proportional to the width of the distribution of local number densities in the liquid. This correlation suggests that a distribution of different, slowly varying local number densities in a liquid establishes an inhomogeneously broadened distribution of distinct vibrational frequencies. The relative contributions of homogeneous and inhomogeneous broadening are shown to change significantly with temperature. A general theory for excite-and-probe vibrational dephasing experiments performed using transient stimulated Raman scattering in both low and high laser depletion is presented.

34092 (NP—3770063) Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition. Frick, B.R. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 5 Jul 1980. 161p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770063.

Portions are illegible in microfiche products; Thesis.

An empirical equation is presented to describe the adsorption of organic materials, which are relevant in water treatment processes, on activated carbon surfaces. In the case of multicomponent systems this equation also describes the displacement of materials, which can only be adsorbed with a fow efficiency, by materials with a high adsorption rate. In this context an attempt is made to represent a multicomponent mixture by a system with three fictitions components with strongly different adsorption properties. Based on this model, a numerical scheme has been developed to calculate the individual isothermal data and the initial concentrations of these fictitions components from experimental equilibrium values of arbitrary mixtures. Finally the applicability of this method for estimation of filter break-through-curves has been tested.

34093 (UCRL—15527) Computer-guided exploration of synthetic pathways. Final progress report. Wipke, W.T. (Lawrence Livermore National Lab., CA (USA)). 15 Feb 1983. Contract W-7405-ENG-48. 81p. NTIS, PC A05/MF A01. Order Number DE83011846.

A user-defined transform capability was developed to extend the computer library of reactions to include new information specifically related to LLNL research including synthesis of dyes, adhesives, silicone polymers, and high energy molecules. A chemical transformation the computer does not know can be entered by indicated which bonds are broken and made and which atoms are added or deleted. The program checks to see that the description is not ambiguous and then generates the reactants for evaluation. A private transform library can be used to augment the public transform library. Appendixes are included on the user defined transform and the AC CHEM reference manual.

34094 Pt/SiO_2. VI. The effects of pretreatment on structures. Nandi, R.K.; Molinaro, F.; Tang, C.; Cohen, J.B.; Butt, J.B.; Burwell, R.L. Jr. (Northwestern Univ., Evanston, IL). *Journal of Catalysis;* **78**: No. 2, 289-305(Dec 1982). Contract AC02-77ER04254.

Pt catalysts with a wide range of percentage metal exposed have been examined by wide-angle and small-angle x-ray scattering, extended x-ray absorption fine structure (EXAFS), and x-ray fluorescence. The wide-angle studies were carried out in a special cell that permitted treatment in a gas environment at moderate temperatures. After exposure to air, a catalyst with 63.5% Pt exposed consists of particles of crystalline Pt_3O_4 with a score of Pt, whereas for 81% exposed, the catalyst is nearly fully oxidized. There is no indication of any difference between the Pt-Pt distance in these catalysts and that in bulk Pt, nor is there any difference for 40% exposed or less (for which the exposed catalyst is Pt metal), even after reductions in H_2. There is little contact area between the catalyst and the support. For the lowest percentage metal exposed (6.3%), reductions in hydrogen do not change the microstrains within particles, but there is reduction in particle size, which is greater the higher the reduction temperature. The activity of this catalyst decreases in the same manner. The mean-square amplitude of vibration increases with the temperature of H_2 reduction for several catalysts, as does the catalytic activity.

34095 Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts. Vaishnava, P.P. (West Virginia Univ., Morgantown); Montano, P.A.; Tischer, R.E.; Pollack, S.S. *Journal of Catalysis;* **78**: No. 2, 454-460(Dec 1982).

In this study a series of Fe-Mo/Al_2O_3 catalysts with different atomic ratios, R = Mo/Mo + Fe, of 0.05, 0.25, 0.50, 0.75, 0.90, and 0.95 were prepared and characterized by x-ray diffraction and Moessbauer and Auger spectroscopic techniques. The percentage conversions of coal liquids soluble in tetrahydrofuran (THF), ethyl acetate, and pentane as a function of R values were also determined. Evidence of the interaction between the support and the active components of the catalysts was observed. Additional evidence of the variation in the amount of different species in the catalyst with the change in the concentration of iron atoms was also found. The activity of the Mo/Al_2O_3 catalyst was highly influenced by the presence of Fe atoms in the samples.

34096 Preparation and reaction of metal ketene complexes of Zr and Ti. Straus, D.A.; Grubbs, R.H. (California Inst. of Tech., Pasadena). *Journal of the American Chemical Society;* **104**: No. 20, 5499-5500(6 Oct 1982).

This report studies the general reaction mechanism route to unsubstituted and alkyl-substituted ketene complexes of titanium and zirconium. Results indicated that the reaction mechanism de-

scribed in this report can be used to generate a variety of ketene complexes that show a range of reactivities. Their use of models for catalytic intermediates as well as reagents for organometallic and organic synthesis is under further study.

34097 Biological paramagnetic center: octahedrally coordinated nickel(III) in the methanogenic bacteria. Lancaster, J.R. Jr. (Utah State Univ., Logan). *Sciences (New York);* **216**: 1324-1325(18 Jun 1982). Contract AC02-81ER10875.

Methanobacterium bryantii was grown in medium supplemented with nickel-61, an isotope with a nuclear spin of 3/2. The appearance of nuclear hyperfine structure in the electron paramagnetic resonance spectrum of a cell extract identified a previously observed signal as nickel(III) in an environment of octahedral coordination with rhombic distortions. 1 figure.

34098 Lead aerosol Brownian collision rates at normal and elevated temperature: theory. Marlow, W.H. (Brookhaven National Lab., Upton, NY). *Journal of Colloid and Interface Science;* **87**: No. 1, 209-215(May 1982). Contract AC02-76CH00016.

Lifshitz-van der Waals theory including retardation is used to compute the attractive potential between pairs of lead spheres of 1-, 10-nm, and 1- and 10-nm radii at 293, 840, and 1059°K and the energies are plotted as functions of particle surface separations. These curves are then used to compute the particle collision rates using a recently published generalization of Fuchs' interpolation formula which includes the effect of particle interaction potentials. The results indicate a size-dependent enhancement of particle collision rates due to van der Waals attraction. Collision rates are shown to bracket the rate measured by Graham and Homer whose data fit a free-molecular self-preserving distribution. The effect of temperature upon collision rates is to decrease them as temperature rises despite a corresponding increase in the attractive interaction energy of the particles.

34099 Preferred orientation of guest molecules in low-temperature matrices: SF_6 in xenon. Jones, L.H.; Swanson, B.I.; Fry, H.A. (Los Alamos National Lab., NM). *Chemical Physics Letters;* **87**: No. 4, 397-399(2 Apr 1982).

Infrared spectral observations of highly oriented SF_6 molecules on low-symmetry sites in xenon matrices formed at 10°K are reported. This study offers proof of our earlier interpretation of site-symmetry splitting and dynamic averaging of SF_6 in xenon matrices. 2 figures.

34100 Amorphous silica solubilities. VI. Postulated sulfate-silicic acid solution complex. Marshall, W.L.; Chen, C.T.A. (Oak Ridge National Lab., TN). *Geochimica et Cosmochimica Acta, Supplement;* **46**: No. 3, 367-370(Mar 1982). Contract W-7405-ENG-26.

A solution complex of composition $Si(OH)_4.SO_4^{2-}$ is postulated to account for the salting-in of amorphous silica by aqueous sodium sulfate solutions at high temperatures. The postulate is suggested by (1) the observed salting-in effect, (2) the calculation of association constants that adhere remarkably to a straight line van't Hoff relation, providing a nearly constant and feasible value for the heat of association from 0 to 350°C, and the reasonable spatial structure envisioned for the weak complex. 2 figures, 1 table.

34101 Reliable static electric dipole polarizabilities for heavy elements. Christiansen, P.A.; Pitzer, K.S. (Lawrence Berkeley Lab., CA). *Chemical Physics Letters;* **85**: No. 4, 434-436(22 Jan 1982). Contract W-7405-ENG-48.

The static electric dipole polarizabilities for Rb and Cs are obtained from finite-field SCF and CI calculations using relativistic effective potentials developed by Christiansen et al. Results agree with the experimental values of Molof et al. to within approx. = to 5%. By contrast, calculations using Phillips-Kleinmann type potentials for Cs were seriously in error. 2 tables.

34102 Unique and multiple solutions of a family of differential equations modeling chemical reactions. Williams, L.R. (Indiana Univ., South Bend); Leggett, R.W. *SIAM (Society for Industrial and Applied Matheatics) Journal of Mathematical Analysis;* **13**: No. 1, 122-133(Jan 1982). Contract W-7405-ENG-26.

Uniqueness and multiplicity of solutions are studied for the boundary value problem $\beta x''(t)-x'(t) + pf(x(t)) = 0$, $0 \leq t \leq 1$, $\beta > 0$, $p > 0$, $\beta x'(0) - x(0) = 0$, $x'(1) = 0$, which arises in chemical reactor theory. The reaction rate f is given by $f(x) = (q-x)\exp[-k/(1 + x)]$, $k > 0$, $q > 0$. Uniqueness is shown for (1) sufficiently small p, (2) certain regions of p and sufficiently small β, (3) large p and sufficiently large β and (4) fixed β and sufficiently large p. Regions of points (β, p, q, k) are identified where there are at least three solutions. The combination of these results gives an improved picture of the behavior of the number of solutions as p and β vary.

34103 Thermal conductivity of mixtures of hydrogen with nitrogen. Kestin, J. (Brown Univ., Providence, RI); Nagasaka, Y.; Wakeham, W.A. *Berichte der Bunsengesellschaft fuer Physikalische Chemie;* **86**: 187-191(1982). Contract AC02-81ER10811.

The paper reports absolute measurements of the thermal conductivity of mixtures of hydrogen and nitrogen in the pressure range 0.7 to 10 MPa at a nominal temperature of 27.5°C. The experimental results have an estimated uncertainty of +-0.3%. The mixture thermal conductivity in the limit of zero-density can be described with the aid of the available kinetic theory only if empirical adjustments are made to some of the collision-integral ratios characteristic of the unlike interactions. The need for these adjustments is taken as evidence that the available kinetic theory formulae are not sufficiently accurate for gas mixtures in which the mass ratio of the molecules is large. At elevated densities the calculation scheme of Mason and his coworkers cannot provide a description of the experimental data within their uncertainty, even when empirical adjustments of a parameter characteristic of the unlike interactions are allowed. 4 figures, 5 tables.

34104 Equilibrium constant for the dimerization of bisulfite ion to form $S_2O_5^{2-}$. Connick, R.E.; Tam, T.M.; von Deuster, E. *Inorganic Chemistry;* **21**: 103-107(1982). Contract W-7405-ENG-48.

At high concentrations in aqueous solution, bisulfite ion dimerizes to form the species $S_2O_5^{2-}$. The equilibrium quotient for the reaction reversible $2HSO_3^- \rightarrow S_2O_5^{2-} + H_2O$ has been determined by combining Raman intensity measurements of HSO_3^- with ultraviolet absorption data on $S_2O_5^{2-}$. Unlike previous determinations, the method requires no assumption about constancy of the equilibrium quotient over the range of solutions measured, although it was necessary to assume a constant molar absorptivity in the UV for $S_2O_5^{2-}$ and a constant molar Raman intensity for HSO_3^-. Earlier measurements reported in the literature, based only on UV measurements of $S_2O_5^{2-}$ absorption and the assumption of constant equilibrium quotient and molar absorptivity, are shown to be seriously in error. Variations of the equilibrium quotient with ionic strength and temperature are reported. A value of Q/sub d/ of 0.088 M^{-1} was found for a dilute solution of bisulfite in 1 M $NaClO_4$ solution at 25°C. In addition to the well-characterized form of bisulfite ion having the hydrogen attached to the sulfur, Raman evidence is reported for the presence of appreciable amounts of the isomer with the hydrogen bonded to one of the oxygens. 3 figures, 4 tables.

34105 Cluster-variation method for the triangular lattice gas. Osorio, R.; Falicov, L.M. (Lawrence Berkeley Lab., CA). *Journal of Physics and Chemistry of Solids;* **43**: No. 1, 73-79(1982). Contract W-7405-ENG-48.

A triangular lattice gas with nearest-neighbor repulsions and three-particle attractions is examined in a three-sublattice triangle approximation as a model for lithium intercalation in the transition metals dichalcogenides. Order-disorder phase diagrams and thermodynamic functions are computed. Some peaks in the incremental capacity as function of concentration in the experimental data of Thompson are reproduced in our model. 8 figures.

34106 **Tunable laser diode study of the nu_3 band of SiF_4 near 9.7 μm.** Patterson, C.W. (Los Alamos National Lab., NM); McDowell, R.S.; Nereson, N.G.; Krohn, B.J.; Wells, J.S.; Petersen, F.R. *Journal of Molecular Spectroscopy;* **91**: 416-423(1982).

Doppler-limited tunable-diode laser spectra of the stretching fundamental nu_3 of $^{28}SiF_4$ near 1031 cm^{-1} were analyzed and the spectroscopic constants determined. The nu_3 vibrational dipole moment derivative was determined for several rovibrational lines. 3 tables.

34107 **Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes.** Pickering, R.A.; Angelici, R.J. (Ames Lab., IA). *Journal of Organometallic Chemistry (Amsterdam);* **225**: 253-263(1982). Contract W-7405-ENG-82.

The dithiocarbene complex $W(CO)_5[C(SCH_3)_2]$ reacts with tertiary phosphines, PPh_2CH_3m $PPh(CH_3)_2$, $P(C_2H_5)_3$ and $P(OCH_3)_3$ to form the phosphorane complexes $W(CO)_5[(Ch_3S)_2C{=}{=}PR_3]$ and with $HPPh_2$ to form the phosphine complex $W(CO)_5(PPh_2[CH(SCH_3)_2])$. Kinetic studies of both types of reactions show that their rates are first order each in $W(CO)_5[C(SCH_3)_2]$ and in the phosphorud ligand. A mechanism involving rate determining phosphorus attack at the carbene carbon followed by rapid rearrangement to the product is consistent with this rate law. Rate constants for the reactions increase with increasing nucleophilicities of the phosphines: $P(OCH_3)_3 < PPh_2H < PPh_2CH_3 \simeq PPh(CH_3)_2 < P(C_2H_5)_3$. The ΔH^{+-} values decrease ($P(OCH_3)_3 > PPh_2H > PPh_2(CH_3) > PPh(CH_3)_2 > P(C_2H_5)_3$) as the nucleophilicities of the phosphines increase. The ΔS^{+-} values (~ -30 e.u.) remain essentially constant for all the reactions. The cyclic dithiocarbenes W(CO)5[CS(CH2)/sub n/S], where n = 3 or 4, react with $PPh_2(CH_3)$ to form the cyclic phosphorane complexes, W(CO)5[S(CH3)/sub n/SC==PPh2(CH3)]. The 6- and 7-membered cyclic dithiocarbenes also react with PPh_2H to form the phosphine complexes, W(CO)5(PPh2[CS(CH2)/sub n/S(H)]). 5 tables.

34108 **Thermal decomposition of trans-dibromotetraaquovanadium(III) bromide, $[VBr_2(H_2O)_4]Br.2H_2O$.** Bamberger, C.E.; Brookhart, K.; Robinson, P.R. (Oak Ridge National Lab., TN). *Inorganica Chimica Acta;* **57**: 161-164(1982). Contract W-7405-ENG-26.

The thermal decomposition of $[VBr_2(H_2O)_4]Br.2H_2O$, I, in an argon atmosphere proceeds mainly toward producing V_3O_5; a small fraction of V(III), less than 5%, disproportionates into $VOBr_2$ and a V(II) intermediate which is oxidized in situ with the corresponding evolution of hydrogen. The decomposition of I in steam proceeds similarly to that in argon up to about 500°C. At higher temperatures additional hydrogen is evolved and mixtures of V_4O_7 and V_5O_9 are the final products.

34109 **New $(TMTSF)_2X$ derivatives: a change in the selenium network dimensionality derived from the molecular and crystal structures of $(TMTSF)_2(FSO_3)$[T = 298K, 123K] and $(TMTSF)_2(BrO_4)$ T = 298K.** Williams, J.M. (Argonne National Lab., IL); Beno, M.A.; Appelman, E.H.; Capriotti, J.M.; Wudl, F.; Aharon-Shalom, E.; Nalewajek, D. *Molecular Crystals and Liquid Crystals;* **79**: 319-326(1982). Contract W-31-109-ENG-38.

From Proceedings of the international conference on low-dimensional conductors; Boulder, CO, USA (Aug 1981).

The first crystallographic analysis, as a function of temperature, of a TMTSF (bis-tetramethyltetrasselenafulvalene) derivative was reported. Both $(TMTSF)_2^-(FSO_3)$ and $(TMTSF)_2(BrO_4)$ are isostructural (triclinic, with space group P anti 1) with superconducting $(TMTSF)_2(ClO_4)$. $(TMTSF)_2(FSO_3)$ undergoes a metal-to-insulator transition at 86 to 90K as observed by microwave conductivity, D.C. conductivity, and magnetic susceptibility. The crystal structure contains 2-dimensional sheets of short Se-Se contacts in the molecular stacking direction and perpendicular to the stacking direction. The temperature dependent variations in these contact distances appear to be of special importance in determining the conduction properties of these materials, and are observed to change in a surprising manner when $(TMTSF)_2(FSO_3)$ is cooled (298 → 123K). The homoatomic Se separations within each TMTSF molecule appear to increase slightly, but not significantly. At the same time the entire 2-dimensional sheet of intermolecular (intra- and interstack) Se-Se contacts between TMTSF molecules contract quite anisotropically, which results in an increase in dimensionality of the Se-Se network. Hence, an increase in electrical conduction, in the absence of insulating phenomena, over the temperature range 298 → 123K is not surprising. The intermolecular Se-Se contact distances in $(TMTSF)_2(BrO_4)$ are significantly longer than in $(TMTSF)_2(FSO_3)$ which suggests that the room temperature electrical conductivity of the $(BrO_4)^-$ salt may be dimenished compared to the $(FSO_3)^-$ analogue. 3 figures, 3 tables.

34110 **Optical properties of linear chain haloamine platinum complexes.** Martin, D.S. Jr. (Iowa State Univ., Ames). pp 409-451 of Extended linear chain compounds. Volume 1. Miller, J.S. (ed.). New York, NY; Plenum Publishing Corporation (1982).

This chapter was concerned primarily with the haloamine complexes of platinum and the optical effects that result as a consequence of the formation of one-dimensional chains in the solid state. Similarities and differences between the platinum and palladium systems were summarized. Both elements form inert square-planar complexes in the +2 oxidation state. The octahedral complexes of platinum (N) are relatively stable and familiar. The d-d transitions occur at somewhat lower energies for palladium (II) than for the comparable platinum complex. Both elements form very slightly soluble Magnus-type salts. In the molecular crystals $M(en)Cl_2$ (M = Pd, Pt) with close stacking of planar complexes, the Pt compound had an intense transition polarized in the stacking direction at much lower energy than the free molecule. Z-polarized absorption by the d-d transitions of Pt in the visible region is much more intense than for Pd. There was no evidence for intermolecular electron transfer transitions for palladium, but there was evidence for platinum. Both elements form similar linear stacks of 1:1 mixed-valence compounds with alternating octahedral M/sup IV/ and planar M/sup II/ complexes which possess intense optical absorption in the visible region for light polarized in the chain direction. Contracts between the haloamine platinum systems and the one-dimensional conductors were included. The haloamine complexes did not readily form one-dimensional metallic conductors as had the linear stacks of mixed-valence cyano and oxalato complexes of platinum. 88 references, 16 figures. (DP)

34111 **Electrical conductivity of molten mixtures of antimony(III) chloride-aluminum chloride and antimony(III) chloride-aluminum chloride-sodium chloride.** Petrovic, C. (Univ. of Tennessee, Knoxville); Mamantov, G.; Sorlie, M.; Lietzke, M.H.; Smith, G.P. *Journal of Physical Chemistry;* No. 86, 4598-4605(1982). Contract W-7405-ENG-26.

The electrical conductivity of $SbCl_3$-$AlCl_3$ mixtures was measured for melts containing 2.5-60.0 mol % $AlCl_3$ at tempertures ranging from 81-224°C for 2.5 mol % $AlCl_3$ to 189-212°C for 60.0 mol % $AlCl_3$. These data were accurately represented by the empirical equation $\ln \kappa = A_1 - A_2T^{-1} - A_3T$/sup 1/10/, where κ is the specific conductivity and A_1, A_2, and A_3 are adjustable parameters. For melts containing 2.5 to 30.0 mol % $AlCl_3$, deviations from Arrhenius behavior were large, and in the range 2.5 to 10.0 mol % $AlCl_3$ the conductivity passed through a maximum T/sub m/ as a function of temperature. At 2.5 mol % $AlCl_3$ the maximum occurred at 180°C with a specific conductivity of 0.00107 S cm^{-1}. Isothermal conductivity-composition curves passed through maxima that shifted from 0.042 S cm^{-1} and 25 mol % $AlCl_3$ at 100°C to 0.092 S cm^{-1} and 35 mol % $AlCl_3$ at 200°C. Conductivity as a function of temperature up to about 225°C was measured for $SbCl_3$-$AlCl_3$-NaCl melts containing 5.0 to 5.0, 10.0 to 5.0, and 10.0 to 10.0 mol % $AlCl_3$ and NaCl, respectively. It was found that at low temperatures the addition of NaCl to a $SbCl_3$-rich $SbCl_3$-$AlCl_3$ mixture results in a substantial conductivity decrease. Although the data for $SbCl_3$-$AlCl_3$ melts can be interpreted in terms of a Stokesian diffusional transport mechanism, the $SbCl_3$-$AlCl_3$-NaCl data favor the occurrence of a non-Stokesian chloride-exchange transport process in addition to Stokesian conductivity. 5 figures.

34112 Algorithm for a modified Martin-Stanford equation of state. Morrey, J.R. (Battelle Memorial Inst., Richland, WA). *Computers and Chemistry;* 6: No. 2, 65-86(1982).

An algorithm is described which calculates pressures as a function of temperatures and volumes down to and below the critical volume. It will operate with only critical pressure, temperature, volume and normal boiling or sublimation temperafures as input parameters. It also provides the option of using vapor-pressure, isochoric and/or liquid density data to improve its predictive ability. Two equations of state are available options. The algorithm calculates the vapor pressure, coexistence line, and relative amounts of liquid and vapor. Its utility is demonstrated by application to hydrogen, helium, neon, carbon dioxide, water, ammonia, argon, and methane, which cover the range of normal values for critical compressibility coefficients are given to accurately calculate PVT data for hydrogen, neon, helium, argon, methane, carbon dioxide, ammonia, and water.

34113 Nernst-Einstein equation in high-defect-content solids. Murch, G.E. (Argonne National Lab., TN). *Philosophical Magazine, [Part] A: Defects and Mechanical Properties;* 45: No. 4, 685-692(1982). Contract W-31-109-ENG-38.

The classical form of the Nernst-Einstein relation is discussed. It is shown that it leads to an obviously non-general relation between the tracer diffusion coefficient and the chemical diffusion coefficient. The Onsager phenomenological equations are used to deduce an exact form of the Nernst-Einstein relation which is in agreement with that given without proof by Kubo. Other exact relations among the mobility, tracer diffusion coefficient and chemical diffusion coefficient are deduced. The origin and meaning of the Haven ratio is discussed in the light of results from recent lattice-gas calculations.

34114 Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions. Chiang, T.C. (Univ. of Illinois, Urbana); Kaindl, G.; Eastman, D.E. *Solid State Communications;* 41: No. 9, 661-665(1982).

Submonolayers of rare gases adsorbed on Al(111) have been studied using photoemission techniques. Coverage-dependent core level binding energy shifts and work function changes have been measured; polarizabilities and dipole moments are deduced. Results indicate that adatom spatial distributions for Xe submonolayers adsorbed on Al(111) at 40 K are best described by a random 2-dimensional distribution, and there is negligible charge transfer from the Al substrate onto the Xe adatoms in the photoionization process.

34115 Concurrent and competitive homolysis and elimination reactions of (α-phenylethyl)aquocobaloxime. Gjerde, H.B.; Espenson, J.H. (Iowa State Univ., Ames). *Organometallics;* 1: No. 3, 435-440(1982). Contract W-7405-ENG-48.

The kinetics of decomposition of $PhCH(CH_3)Co(dmgH)_2OH_2$ in aqueous methanol were studied in acidic solution and suggest parallel reactions of the parent complex (k/sub b,298/ = 3.55 x 10^{-3} s^{-1}, ΔH/sup double dagger/ = 28.6 +- 1.1 kcal mol^{-1}, ΔS/sup double dagger/ = 25.7 +- 3.6 cal mol^{-1} K^{-1}) and its conjugate acid (k/sub a,298/ = 1.48 x 110^{-2} s^{-1}, ΔH/sup double dagger/ = 23.2 +- 0.2 kcal mol^{-1}, ΔS/sup double dagger/ = 11.1 +- 0.7 cal mol^{-1} K^{-1}), the two reactants differing by the extent of protonation of the oxime oxygens and interrelated by an equilibrium constant K/sub H/ = 8.1 +- 0.4 M^{-1}. The products consist of Co^{2+}, four dimers of $PhCHCH_3$ (including a quinoid from α-to-para addition and 1,3-diphenylbutane as well as meso- and rac-2,3-diphenylbutanes) and styrene. The results suggest parallel homolytic (~ 72%) and β-elimination (~ 28%) pathways. The intermediacy of cobalt(II) cobaloxime was confirmed by experiments with added H_2O_2 and $Co(NH_3)_5Br^{2+}$. These reagents do not alter the rate constant but do produce mixtures of Co^{2+} and $(H_2O)_2Co(dmgH)_2^+$ or $BrCo(dmgH_2)_2OH_2$, in ratios consistent with the rate constants determined independently for the Co(II) complex.

34116 Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of NaCl and CsCl at 25°C. Rard, J.A.; Miller, D.G. (Lawrence Livermore National Lab., CA). *Journal of Chemical and Engineering Data;* 27: No. 2, 169-173(1982). Contract W-7405-ENG-48.

The osmotic coefficients of aqueous CsCl, $SrCl_2$, and mixtures of NaCl and CsCl have been measured at 25°C by the isopiestic method. The solubilities of CsCl and $SrCl_2$-$6H_2O$ have also been measured at this temperature. These experimental data are compared with other available activity and solubility data and are in good agreement in most cases. Least-squares equations were used to represent the single-salt osmotic coefficients, and these equations were used to calculate water activities and mean molal activity coefficients. Data for the NaCl-CsCl solutions are accurately represented by the two-parameter form of Pitzer's equations. 2 figures, 6 tables.

34117 Onset of the molecular quasicontinuum in SF_6. Galbraith, H.W.; Ackerhalt, J.R. (Los Alamos National Lab., NM). *Chemical Physics Letters;* 84: No. 3, 458-461(15 Dec 1981).

A new model of V-V relaxation in SF_6 based upon an actual expansion of the molecular potential energy surface is presented. The model predicts both a strict upper bound on the number of vibrational levels coupled at any given level and an onset of the molecular quasicontinuum at $8nu_0$.

34118 Some observations on the chemistry of KO_2-DMSO solutions. Arudi, R.L.; Allen, A.O.; Bielski, B.H.J. (Brookhaven National Lab., Upton, NY). *FEBS (Federation of European Biochemical Societies) Letters;* 135: No. 2, 265-267(Dec 1981).

The various aspects of the chemistry of KO_2-dimethyl sulfoxide (DMSO) studied were: (1) reactions of the superoxide with nitro-blue tetrazolium (NBT^{2+}), (2) optical properties of KO_2 solutions, (3) determination of the evolution of O_2 formed by reaction of O_2^- with excess I_2 by gas chromatography, and (4) titration of the O_2^- by ferricytochrome c. The first two methods listed were found to give unsatisfactory results because of the interference by the absorption of O_2, dimsyl ion ($CH_3SOCH_2^-$) and (if crown ether is added to solubilize KO_2) the K^+-crown ether complex. The other two methods give satisfactory results. (BLM)

34119 Ab initio effective core potentials including relativisitc effects: a procedure for the inclusion of spin-orbit coupling in molecular wavefunctions. Ermler, W.C. (Stevens Inst. of Tech., Hoboken, NJ); Lee, Y.S.; Christiansen, P.A.; Pitzer, K.S. *Chemical Physics Letters;* 81: No. 1, 70-74(1 Jul 1981). Contract W-7405-ENG-48.

The first ab initio procedure for the treatment of spin-orbit coupling in molecules based on the use of relativistic effective potentials derived from Dirac-Fock atomic wavefunctions is presented. A rigorous definition for the spin-orbit operator is given and its use in molecular calculations discussed.

34120 Studies of gas-phase clusters: the solvation of HNO_3 in microscopic aqueous clusters. Kay, B.D.; Hermann, V.; Castleman, A.W. Jr. (Univ. of Colorado, Boulder). *Chemical Physics Letters;* 80: No. 3, 469-474(15 Jun 1981). Contract AC02-78EV04776.

The formation and stability of aqueous clusters of nitric acid were studied utilizing a free-jet expansion technique, coupled with electron impact ionization mass spectrometry. Evidence for the onset of solvation at very small cluster sizes is presented.

34121 Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces. Castleman, A.W. Jr.; Holland, P.M.; Kay, B.D.; Keesee, R.G.; Maerk, T.D.; Peterson, K.I.; Schelling, F.J.; Upschulte, B. (Univ. of Colorado, Boulder). *Journal of Vacuum Science and Technology;* 18: No. 2, 586-588(Mar 1981). Contract AC02-78EV04776.

Using high-pressure mass spectrometric technique, details of the primary clustering steps leading to the nucleation of bulk liquid

from the vapor are obtained by direct observation of the equilibrium cluster distribution. Results for a large number of systems have been determined, including clusters of neutral inorganic molecules and clusters of different molecules about ions. Determination of enthalpy and entropy values from these data allow one to extract information on the strengths of bonds and orientation of molecules within these clusters through correlation with the results of classical and molecular theories. Observations of mixed cluster species are proving to be of interest in the study of solvation phenomena, and because of their similarity to entities observed in surface desorption studies, are also relevant to surface science. In addition, microclusters are good prototypes for elucidating the details of ordering and structures analogous to those existing at interfaces. This paper is devoted to a review of results.

34122 Velocity-selected molecular beam study of rotational excitation in the reaction C + NO → CN + O. Krause, H.F. (Oak Ridge National Lab., TN). *Chemical Physics Letters;* **78**: No. 1, 78-80(15 Feb 1981). Contract W-7405-ENG-26.

The reaction $C(^3P) + NO \rightarrow CN(X\ ^2\Sigma^+) + O(^3P)$ has been studied in a beam-cell configuration. $CN(X\ ^2\Sigma^+)$ molecules are formed in the lowest vibrational (nu = 0-3) and rotational states (K = 0-35). The vibrational populations decrease monotonically as nu increases; non-Boltzmann and relatively cold rotational distributions are observed. The reaction appears to proceed via a direct mode.

34123 Relativistic modifications of covalent bonding in heavy elements. Calculations for TlH. Pitzer, K.S.; Christiansen, P.A. (Lawrence Berkeley Lab., CA). *Chemical Physics Letters;* **77**: No. 3, 589-592(1 Feb 1981). Contract W-7405-ENG-48.

To determine whether the orthogonal triplet bond proposed by Pyper is an important factor in the bonding of hydrogen to a very heavy element with a single p/sub 1/2/ valence electron, dissociation curves for TlH using fully relativistic quantum methods were computed. The computed results and literature information indicate that the orthogonal triplet interaction makes no significant contribution to bonding.

34124 Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics. Goble, J.H.; Winn, J.S. (Lawrence Berkeley Lab., CA). *Chemical Physics Letters;* **77**: No. 1, 168-171(1 Jan 1981). Contract W-7405-ENG-48.

The well regions of the weakly bound ground states of Be_2, Mg_2, Ca_2 and Sr_2 were analyzed in terms of the parameters of analytic potential functions. From this analysis, it is shown that bonding in these molecules is qualitatively different from that found in other molecules of similar binding energy.

34125 Cavity boundary effects within the Onsager theory for dielectrics. Ehrenson, S. (Brookhaven National Lab., Upton, NY). *Journal of Computational Chemistry;* **2**: No. 1, 41-52(1981).

Means by which the Onsager theory of dielectrics may be modified in a general way to include important structurally nonspecific electrical effects exercised at or near the cavity boundary are developed and discussed. In essence they rely upon extraction of limiting numerical solutions of the Laplace equation potentials for multiple shells approximating regions of smoothly varying permittivity surrounding the dipole-containing cavity. The results of several such modifications, which usefully retain the original reaction and cavity field forms, are applied to evaluate the dielectric constants of polar solvents acting as support media for mean-space-charge attenuation of intracavity electrical interactions, and in correlation of isolated molecule and condensed phase properties of formally nonassociated solvents. For the most part such predictions and correlations are found to be improved by a wide variety of physically reasonable continuity functions. Where they are not, more rational patterns of deviations consistent with possible modes of intramolecular charge transfer and weak intermolecular association in formally nonassociated liquids are detected. Some limited comparisons with particle- and structure-dependent theories, e.g., the mean spherical model and discrete lattice formulations, also suggest that the present permittivity modifications can effectively simulate important short-range nonspecific liquid ordering effects. Various factors relating to possible adaption of the limit procedures developed to other inhomogeneous dielectric medium calculations are also briefly outlined.

34126 Ab initio calculation of the structures and properties of some lithium-Lewis base complexes. Bentley, J.; Carmichael, I. (Univ. of Notre Dame, IN). *Journal of Physical Chemistry;* **85**: 3821-3826(1981).

Unrestricted Hartree-Fock molecular orbital calculations have been conducted on the molecules $LiOH_3$, $Li(OH_3)_2$, and $LiNH_3$, using 6-31G** and larger basis sets. Equilibrium have been determined, and electron spin densities have been calculated which are in good agreement with experimental data. Harmonic vibrational frequencies have been predicted for the modes involving lithium. Calculations of spin densities for the model systems ArLi and $ArLiOH_3$ provide a basis for the interpretation of matrix site effects in the ESR spectra of these complexes. 2 figures, 7 tables.

34127 Studies of the formation and structure of homomolecular and heteromolecular clusters. Castleman, A.W. Jr.; Kay, B.D.; Hermann, V.; Holland, P.M.; Maerk, T.D. (Univ. of Colorado, Boulder). *Surface Science;* **106**: 179-187(1981). Contract AC02-78EV04776.

In order to follow the course of change from the gaseous to the condensed state, investigations of the formation and properties of hydrogen bonded clusters have been made utilizing a supersonic free-jet expansion method, coupled with modulated molecular beam detection techniques. Detailed studies of the cluster distributions for the system (H_3O)/sub n/, $H_3O)$/sub n/(D_2O)/sub m/, and mixed clusters of the type (HNO_3)/sub x/(H_3O)/sub y/ were undertaken. The findings suggest that small clusters grow in the free jet to a point where they become vibrationally hot; with insufficient subsequent cooling collisions the clusters undergo unimolecular decomposition to the quasi-stable distribution detected in the mass spectrometer. A new finding of enhanced isotope effects in small clusters was made. Evidence was also obtained which suggests that clusters at very small sizes display properties normally associated with the condensed phase.

34128 Dynamical aspects of precursor state kinetics. Adams, J.E.; Doll, J.D. (Los Alamos National Lab., NM). *Surface Science;* **111**: 492-502(1981).

An examination of precursor adsorbed states from a dynamical viewpoint reveals that two commonly used models of precursor kietics are not generally applicable. For the case of molecular chemisorption, simple, linear rate laws may not be valid unless the adsorbate-solid system meets certain dynamical criteria. On the other hand, for dissociatively chemisorbed species, a serious error can be made in estimating the effect of temperature on the adsorbate dissociation rate if, as is usually done, the temperature dependence of the initial sticking probability of the molecule is ignored.

34129 Incompatibility between the Kohler method and the subregular model. Brynestad, J. (Oak Ridge National Lab., TN). *CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry;* **5**: No. 2, 103-104(1981). Contract W-7405-ENG-26.

It is demonstrated that the Kohler method is incompatible with the subregular model, because it gives rise to a dichotomy in the predicted behavior of the partial (excess) free energy of a solute in the terminal regions of the ternary system.

34130 Bridged ferrocenes. VII. Correlation of redox potentials with structure. Fujita, E. (Brookhaven National Lab., Upton, NY); Gordon, B.; Hillman, M.; Nagy, A.G. *Journal of Organometallic Chemistry (Amsterdam);* **218**: 105-114(1981). Contract AC02-76CH00016.

The redox potentials for oxidation of ferrocenes with hydrocarbon bridges and of corresponding ketoferrocenes were measured. For the reduced compounds, correlations were observed between the potentials and the iron to ring distances. For the ketoferrocenes, the importance of proper alignment of the carbonyl with

the cyclopentadienyl rings is noted. Other possible relationships are discussed. 4 figures, 2 tables.

34131 **Nuclear magnetic resonance, paramagnetic ion induced relaxation method to differentiate between 1,3-diketo and 1,3-keto-enol isomers.** Seltzer, S. (Brookhaven National Lab., Upton, NY). *Journal of Organic Chemistry;* **13**: 2643-2650(1981).

In aqueous solution manganous ion is shown to broaden the methyl ^1H resonance of the enol form of acetylacetone. Under the same conditions, where [Mn(II)] << [keto-enol] and << [1,3-diketonel], the methyl of the diketo form is affected to a smaller degree. This is primarily due to the more favorable association constant of Mn(II) with the keto-enol than with the diketo form. This diagnostic is used to differentiate between resonances due to diketo and keto-enol forms of the substrate for maleylacetone cis-trans isomerase and is proposed for use in elucidating NMR spectra of other diketo/keto-enol mixtures. 4 figures, 2 tables.

34132 **Interacting band analysis of the high-resolution spectrum of the 3nu$_3$ manifold of SF_6.** Patterson, C.W. (Los Alamos Scientific Lab., NM); Krohn, B.J.; Pine, A.S. *Journal of Molecular Spectroscopy;* **88**: 133-166(1981).

The two infrared-active vibrational bands of the 3 nu$_3$ manifold of SF_6 have been recorded at T = 160 K with near Doppler-limited resolution using a tunable laser difference-frequency spectrometer. Most of the principal structure has been identified, and over 700 lines with J ≦ 33 have been fitted with a model Hamiltonian which allows the l - 1 and l = 3 subbands to interact. The analysis yields the values of ten spectroscopic constants. When earlier results for the nu$_3$ band are considered, the values of eight additional constants are derived. The effective harmonic frequency, ω^0_3, and the three anharmonic coefficients X_{33}, G_{33}, and T_{33}, have been determined with high precision, so that the vibrational levels in the n nu$_3$ ladder can be predicted accurately for several values of n. The Cartesian basis (n/sub 3x/, n/sub 3y/, n/sub 3z/) is found to be the best representation for the vibrational sublevels. Analysis of the rovibrational line strengths reveals that the weak (2, 1, 0) band of 3 nu$_3$ has a very small intrinsic dipole transition moment, so that this band derives most of its intensity by borrowing from the strong (3, 0, 0) band.

34133 **Hydrogen chemisorpton on Pt single crystal surfaces in acidic solutions.** Ross, P.N. Jr. (Lawrence Berkeley Lab., CA). *Surface Science;* **102**: 463-485(1981). Contract W-7405-ENG-48.

Hydrogen chemisorption from dilute acidic solution onto Pt single crystal surfaces was examined using an electrochemical cell directly coupled to LEED/Auger analytical system. No pre-anodization was used prior to observing hydrogen adsorption by cyclic voltammetry so that clean surfaces having the ordered structures indicated by LEED were studied. The problem of contributions from non-ordered parts of the electrode like support wires and edges was solved by using a gold evaporation masking technique. The specific contribution of atomic imperfections to the voltammetry curve was deduced from the ordered and countable imperfections occurring on high Miller index single crystal surfaces that have a stepped structure. The H-Pt bond energy was found to be structure sensitive, and sensitive both to local site geometry and long range order in the surface. The bond strength was found to vary systematically: n(111) x (100) > (100) > n(111) x (111) > (110) > (111). Distinct states for hydrogen at steps versus hydrogen on terraces could be distinguished. The (110) surface is shown to be a (111) vicinal, probably the [3(111) x 2(111)] microfacetted surface. The zero coverage heat of adsorption on the well-ordered (111) surface (48 kJ/mol) in solutions is the same as the value reported by Ertl and co-workers for adsorption on a (111) surface in vacuum. Adsorption isotherms for hydrogen on the (111) and (100) surfaces are adequately fit by the classical model for immobile adsorption at single sites with nearest neighbor repulsive interaction.

34134 **Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures.** Smith, D.H.; Begun, G.M.; Child, W.C. Jr. (Oak Ridge National Lab., TN). *Journal of the Chemical Society, Faraday Transactions 2;* **2**: No. 77, 1399-1409(1981). Contract W-7405-ENG-26.

The Raman spectra of molten Li_2SO_4 and of seven molten Li_2SO_4-K_2SO_4 mixtures have been recorded at temperatures to 1240 K. The broad band at 1100 to 1190 cm^{-1} (assigned to nu$_3$ of SO_4^{2-} in T/sub d/ symmetry) has been observed to split in these melts, indicating the presence of structures with C/sub 3 nu/ and C/sub s/ symmetry. These findings are in agreement with models proposed from x-ray diffraction studies. 5 figures, 4 tables.

34135 **Synthesis and x-ray crystal structure of $[PPN]^+Z[RuIr_4(CO)_9(\mu_2\text{-}CO)_6]^{2-}$.** Fumagalli, A.; Koetzle, T.F.; Takusagawa, F. (Brookhaven National Lab., Upton, NY). *Journal of Organometallic Chemistry (Amsterdam);* **213**: 365-377(1981).

The dianion$[RuIr_4(CO)_{15}]^{2-}$ has been obtained by reductive carbonylation of mixtures of $Ir_4(CO)_{12}$ and $RuCl_3$ x H_2O, and the bis(triphenylphosphine)-iminium salt has been characterized by single-crystal x-ray diffraction techniques. Crystal data: $[((C_6H_5)_3P)_2N]_2[RuIr_4(CO)_{15}]$, space group P1 (Z = 2), a = 11.425(3), b = 14.141(2), c = 25.979(5) A, α = 84.55(1), β = 83.53(2), γ = 82.71(2)°. The mixed-metal cluster has a structure with an elongated trigonal bipyramidal array of metal atoms in which Ru occupies an apical position. The anion is unstable in vacuum or in an N_2 atmosphere yielding predominantly another mixed-metal species which is not as yet fully characterized. Upon reexposure to CO, this latter species is converted back to $[RuIr_4(CO)_{15}]^{2-}$, plus additional products. 2 figures, 4 tables.

34136 **Monte Carlo study of diffusion in a model of an ordered absorbate.** Murch, G.E. (Argonne National Lab., IL). *Philosophical Magazine, [Part] A: Defects and Mechanical Properties;* **43**: No. 4, 871-882(1981).

Monte Carlo results are presented for the chemical diffusivity in a lattice-gas model of an ordered absorbate. The model employed is the square-planar lattice gas with nearest-neighbour repulsive lateral interactions and next-nearest-neighbor attractive square interactions at a temperature less than the critical temperature at 50% coverage. Use is made of the recently derived rigorous form of the Darken equation in order to gain insight into the behaviour of the diffusiviity. Within the ordered c(2 x 2) phase, a strong maximum in the diffusivity is observed. This phenomenon is shown unequivocally to be a result of a rapid change in the absorption isotherm within the ordered phase. 7 figures.

34137 **Enthalpies of formation of SbF_5(l) and Sb_2S_3(c) and the high-temperature thermodynamic functions of Sb_2S_3(c) and Sb_2S_3(l).** Johnson, G.K.; Papatheodorou, G.N.; Johnson, C.E. (Argonne National Lab., IL). *Journal of Chemical Thermodynamics;* **13**: 745-754(1981).

The energies of combustion of Sb(c) and Sb_2S_3(c) in fluorine were measured in a bomb calorimeter. The standard enthalpies of formation ΔH/sub f/°(298.15 K), of SbF_5(l) and Sb_2S_3(c) were derived to be -(1327.95 +- 0.93) kJ mol^{-1} and -(141.8 +- 4.1) kJ mol^{-1}, respectively. High-temperature enthalpy increments were determined for crystalline and liquid Sb_2S_3 by drop calorimetry. The enthalpy and entropy of melting of Sb_2S_3(c) at 823 K were derived to be (40.64 +- 0.20) kJ mol^{-1} and (49.38 +- 0.24) J K^{-1} mol^{-1}, respectively. 5 tables.

34138 **Series expansion methods for extracting ternary diffusion coefficients from Rayleigh interferometric data.** Miller, D.G. (Lawrence Livermore National Lab., CA). *Journal of Solution Chemistry;* **10**: No. 12, 831-846(1981). Contract W-7405-ENG-48.

Three series expansions are examined for use in extracting ternary diffusion coefficients from Rayleigh interferometric data for free diffusion experiments. Convergence comparisons show that, providing enough terms are used, two of the three are suitable, including one used earlier by Albright and Sherrill. A new simpler analysis, using only linear least squares, has been applied to simulated and real data with good results. Advantages and disadvantages of series methods are compared to a direct non-linear least squares analysis.

34139 Isopiestic studies of aqueous solutions at elevated temperatures. III. [(1-y)NaCl + yCaCl$_2$]. Holmes, H.F. (Oak Ridge National Lab., TN). *Journal of Chemical Thermodynamics;* **13**: 101-113(1981). Contract W-7405-ENG-26.

Isopiestic studies have been made on aqueous solutions of the mixed electrolyte [(1-y)NaCl + y $CaCl_2$] over the temperature range 838.5 to 474.2 K. Sodium chloride was used as the reference electrolyte for the calculation of osmotic coefficients. The molatility range covered in this study corresponded to about 0.6 to 6 mol kg^{-1} for NaCl. Pitzer's mixture equation was fitted to each set of osmotic coefficients with a standard deviation of fit (in the osmotic coefficient) ranging from 0.0033 to 0.0039. One mixing parameter (in addition to the pure-electrolyte parameters) is adequate to satisfactorily describe the results. The mixing parameter is small (the maximum contribution to the osmotic coefficient is only about 0.01) and can be neglected in dilute solutions. Activity coefficients for NaCl and $CaCl_2$ in the mixed-electrolyte solution were calculated from Pitzer's equations. Both the osmotic and activity coefficients showed a monotonic decrease with increasing temperature and became much less dependent on molatility. The activity coefficient of $CaCl_2$ is much more dependent on the composition of the mixture than that of NaCl. Excess Gibbs free energies for [(1-y)NaCl + y$CaCl_2$] are positive and become more positive as the temperature increases.

34140 Chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I). A square planar SO_2-transition metal complex. Kubas, G.J.; Ryan, R. (Los Alamos Scientific Lab., NM). *Inorganica Chimica Acta;* **47**: 131-134(1981).

The structure of chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I) has been determined by single crystal x-ray techniques. The complex crystallizes in the space group $P2_1/c$ with cell constants of a = 13.371(6), b = 12.783(6), c = 23.293(10) A and β = 105.01(2)°. Refinements using 2822 unique reflections for which $I \geq 2\sigma(I)$ included anisotropic temperature parameters for all atoms heavier than carbon and hydrogen atoms fixed in idealized positions converged to an unweighted R value of 6.6%. The coordination about the Rh atom is square planar with trans phosphines and a eta^1-planar SO_2 group. The conformation about the Rh-S bond is determined by O-H interactions. The bonding of SO_2 to the complex is discussed.

34141 Structure of N_2 at 49 kbar and 299 K. Cromer, D.T.; Mills, R.L.; Schiferl, D.; Schwalbe, L.A. (Los Alamos Scientific Lab., NM). *Acta Crystallographica, Section B: Structural Crystallography and Crystal Chemistry;* **B37**: 8-11(1981).

A single crystal of N_2 at 49 kbar (4.9 GPa) and 299 K was produced in a Merrill-Bassett diamond-anvil high-pressure cell and examined by x-rays. Pressure was determined by the ruby-fluorescence method. The unit cell is cubic, a_0 = 6.164 (1) A, space group Pm3n, with eight molecules per unit cell. The structure is the same as that of β-F_2 and γ-O_2 at 50 K and atmospheric pressure. For seven refined parameters and 19 observations the final R/sub w/ is 0.0488.

34142 Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$. Holmes, H.F.; Mesmer, R.E. (Oak Ridge National Lab., TN). *Journal of Chemical Thermodynamics;* **13**: 131-137(1981). Contract W-7405-ENG-26.

Isopiestic measurements have been made on aqueous solutions of $NiCl_2$ and $CoCl_2$ at 382.96 and 413.36K. NaCl served as the reference electrolyte for the calculation of osmotic coefficients. At 413.36K hydrolysis of CO^{2+} had a marked effect on the results while at 443.92K hydrolysis of both Ni^{2+} and Co^{2+} was so extensive that no valid results could be obtained. In the absence of hydrolysis Pitzer's equation fits the osmotic coefficients with a standard deviation of 0.003. Parameters derived from the least-squares fit of the osmotic coefficients were used to calculate activity coefficients. Both the osmotic and activity coefficients decreased with increasing temperature and became less dependent on molality. The dependence of the ratio of the activity coefficients of $NiCl_2$ and $CoCl_2$ on molality is approximately independent of temperature.

34143 Study of vapor phase association in an acetic acid-water binary mixture by measurement of thermal conductivity and molecular orbital calculations. Curtiss, L.A.; Frurip, D.J.; Blander, M. (Argonne National Lab., IL). pp 269-272 of Proceedings of the eighth symposium on thermophysical properties. Volume 1. Thermophysical properties of fluids. Sengers, J.V. (ed.). New York, NY; American Society of Mechanical Engineers (1981).

Thermal conductivity measurements are reported for a binary mixture of 51 mole percent acetic acid and 49 mole percent water at 372.6 K and over a pressure range of 7 to 80 kPa (1 kPa = 7.5 torr). A very large enhancement in thermal conductivity is found which is similar to that observed for pure acetic acid vapor. The data can be well represented by assuming the presence of acetic acid and water monomers and acetic acid dimers having thermodynamic parameters which were determined previously. The mixed acetic acid-water dimer contribution to the thermal conductivity enhancement is too small to be analyzed indicating that there is much less mixed dimer present than acetic acid dimer. Ab initio molecular orbital calculations were carried out to determine the energetics and structure of the acetic acid-water dimer to help understand the experimental results. 2 figures, 2 tables.

34144 Ionic conductivity and the weak electrolyte theory of glass. Ingram, M.D. (Univ. of Aberdeen, Scotland); Moynihan, C.T.; Lesikar, A.V. *Journal of Non-Crystalline Solids;* **38 & 39**: 371-376(1980). Contract AS05-78ER05781.

Arguments are advanced in support of a weak electrolyte theory of glass which incorporates the paired interstitialcy mechanism recently proposed for β-alumina. The model can account for such heretofore unexplained phenomena as the temperature dependence of diffusion correlation factors, the mixed alkali effect and the anomalously large jump distances obtained from high-field conductivities.

34145 Thermomechanical theory for reacting immiscible mixtures. Drumheller, D.S.; Bedford, A. *Archive for Rational Mechanics and Analysis;* **73**: No. 3, 257-284(1980). Contract AC04-76DP00789.

A thermochemical theory for reacting immiscible liquids has been previously reported. The kinematic content of the theory was formulated to model the microstructure of the constitutents, and the simplest possible representation of this microstructure was used. The constitutive postulates of the theory reflected the fact that the individual constituents remain separated. In the previously reported work, the equations of motion of the theory were obtained by use of Hamilton's extended variational principle which included a volume fraction constraint. Kinetic energies associated with the local expansion and contraction rates of the constitutents were also included. In this publication, the mechanical theory previously reported is extended to include thermal effects, solid constitutents, chemical reactions, and virtual mass effects. The extended theory is used to obtain models for several types of mixtures that are important in given applications. 47 references. (BLM)

34146 Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III). Chandrasekaran, K.; Natarajan, P. Tiruchirapalli, India; Madras Univ. (1980). 3p.

Electron-transfer reactions between the μ-peroxo-cobalt(III) complexes $[(H_3N)_5Co(\mu\text{-}O_2)Co(NH_3)_5]^{4+}$ (1), $[(H_3N)_4Co(\mu\text{-}O_2)(\mu\text{-}NH_2)Co(NH_3)_4]^{3+}$ (2), and $[(L\text{-}L)_2Co(\mu\text{-}O_2)(\mu\text{-}NH_2)Co(L\text{-}L)_2]^{3+}$ [L-L = ethylenediamine (3), 2,2'-bipyridyl (4), or 1,10-phenanthroline (5)] and $[Ru(bipy)_3]^{2+}$ (bipy = 2,2'-bipyridyl) have been investigated. The reactants have been generated by the electron-transfer quenching of the excited state of $[Ru(bipy)_3]^+$ by the corresponding μ-superoxo-complexes using flash photolysis. The half-wave potentials measured by polarography for complexes (3), (4), and (5) are 1.00 +- 0.05, 1.04 +- 0.05 V respectively. The observed rate constants are used to calculate the self-exchange electron-transfer rate constants for the bridged cobalt(III) complexes. The Marcus cross relationship has been used to predict the rate constants determined earlier for the electron-transfer reaction between (3) and the superoxo-forms of complexes (1), (4), and (5). 3 tables.

4003 Organic Chemistry

REFER ALSO TO CITATION(S) 33180, 34076, 34091, 34093, 34097, 34102, 34107, 34115, 34121, 34125, 34128, 34129, 34130, 34131, 34135, 34140, 34143, 34145, 34146, 34179, 34182, 34186, 34191, 34392

34147 Differential changes in ornithine aminotransferase self-affinity produced by exposure to basic amino acids and increases in the intrinsic electronegativity of the enzyme monomer. Boernke, W.E.; Stevens, F.J.; Edwards, J.J.; Peraino, C. (Argonne National Lab., IL). *Archives of Biochemistry and Biophysics;* **216**: No. 1, 152-157(Jun 1982). Contract W-31-109-ENG-38.

In a previous study ornithine aminotransferase (OAT) was shown to exhibit concentration-dependent self-association in two stages (45,000 M/sub r/ monomers aggregate to form 140,000 to 150,000 M/sub r/ trimers; the trimers then aggregate to form higher-molecular-weight complexes). In an attempt to characterize further the molecular mechanisms involved in OAT aggregation, the present study examined the effects of basic amino acids and keto acids on the aggregation process. Results indicate that basic amino acids (ornithine and lysine) inhibit the association of monomers to form trimers, apparently by interaction with carboxyl groups on the surfaces of the monomers. The aggregation of trimers to form higher-molecular-weight assemblies is not affected by basic amino acids, and neither aggregation stage is affected by the keto acids, α-ketoglutarate, or oxaloacetate. Two different OAT preparations (one fresh, the other 18 months old) differed in aggregation characteristics; the older preparation showed reduced self-affinity at both aggregation stages, but both preparations had similar catalytic efficiencies. Electrophoretic studies indicated that the older preparation contained variants of the enzyme monomer with greater electronegativity than did the fresh preparation. These findings led to the conclusion that OAT purification exposes ionically labile but catalytically insignificant domains on the monomer surface, and the loss of positively charged groups from such regions diminishes the OAT aggregation potential.

34148 Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone. Nesbitt, D.J.; Leone, S.R. (Univ. of Colorado, Boulder). *Chemical Physics Letters;* **87**: No. 2, 123-127(19 Mar 1982).

A dramatic reduction in infrared fluorescence quantum yield with increasing molecular size is observed for directly excited first CH stretch overtones in a series of C_1-C_4 hydrocarbons. Ethane and larger molecules (rho/sub vib/ ≧ 15 states cm^{-1}) appear to undergo rapid intramolecular relaxation within the 1 μs detector risetime. 2 figures, 2 tables.

34149 Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer. Crawford, R.W.; Hirschfeld, T.; Sanborn, R.H.; Wong, C.M. (Lawrence Livermore National Lab., CA). *Analytical Chemistry;* **54**: 817-820(1982).

The use of a linked capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer (GC/MS/FT-IR) has been demonstrated. Although the linking of a packed column GC/MS/FT-IR has been reported, we feel the use of a high-resolution column (SCOT) significantly increases the analytical usefulness of this technique. The linking of the three provides complementary information and eliminates the possibility of comparing spectra from different components due to shifts in retention time. Examples are given by using a known mix of alkyl benzenes and a completely unknown siloxane. 7 figures, 1 table.

34150 Vacuum ultraviolet absorption spectra of aromatic molecules in solution. Kourouklis, G.A.; Siomos, K.; Christophorou, L.G. (Oak Ridge National Lab., TN). *Journal of Molecular Spectroscopy;* **92**: 127-140(1982). Contract W-7405-ENG-26.

The absorption spectra of benzene, naphthalene, azulene, N,N,N',N'-tetramethyl-p-phenylenediamine (TMPD), pyrene, and fluoroanthene were measured in liquid perfluoro-n-hexane (PFn-H) in the range 35,000 to 65,000 cm^{-1} and in liquid n-pentane (n-Pt) in the range 35,000 to 59,000 cm^{-1}, using a 150-μm-thick cell. The absorption spectra in PFn-H show more structure than those in n-Pt and because they are extended in the Rydberg transition region may be used to separate Rydberg from core transitions in the gaseous spectra of the molecules studied. The transmission spectra for PFn-H, n-Pt, and some of the most commonly used hydrocarbon solvents are presented also. 5 figures, 6 tables.

34151 Dynamic sensitivity analysis of chemical reaction systems: a variational method. Seigneur, C.; Stephanopoulos, G.; Carr, R.W. Jr. (Minnesota Univ., Minneapolis). *Chemical Engineering Science;* **37**: No. 6, 845-853(1982).

An approach to the sensitivity analysis of systems governed by ordinary differential equations is presented. It is based on a variational approach and is developed here in the context of chemically reacting systems, although in principal it is more general. The linear analysis generates sensitivity indexes which are a measure of the sensitivity of an objective function to the jth reaction of a mechanism. Both instantaneous and time-averaged sensitivities can be obtained. It also gives the sensitivity to initial concentrations of reactants, or to concentration perturbations at arbitrary times. The use of an objective function permits one to obtain the sensitivity of several species simultaneously in a single analysis, in contrast to other methods where the sensitivity of one species at a time must be determined. In this work the objective functions used are norms involving an arbitrary number of dependent variables. A ranking of the relative importance of each reaction in governing the concentrations of species appearing in the objective function is obtained. Since the sensitivity indexes are time dependent, the analysis may be said to be a dynamic sensitivity analysis. The sensitivity indexes given by this method are related to other standard sensitivity indexes. 6 figures.

34152 Nonlinear polariton effects in the phenanthrene crystal. Johnson, C.K.; Small, G.J. (Ames Lab., IA). *Chemical Physics (Amsterdam);* **64**: 83-93(1982). Contract W-7405-ENG-82.

Two-photon fluorescence excitation (TPE) and second harmonic generation (SHG) spectra of the origin region of the 3500 A system of the phenanthrene crystal at 2 K are presented and compared for both melt-grown and sublimed crystals. The dependence of the upper Davydov component position on the photon polarization and propagation durection reported previously is confirmed for both TPE and SHG. This behavior is considered to be a manifestation of phase matching to the upper branch of the b-polariton dispersion curve and is intrinsic to the two-phase process for transitions which are allowed in both one- and two-photon absorption. Both TPE and SHG are understood as resulting from the fundamental process of polariton fusion. The appearance of the dipole-forbidden lower Davydov component in these spectra is commented on in terms of misalignment and excitation of a longitudinal exciton. 6 figures.

34153 Experimental studies of two dimensional melting. Sinha, S.K. (Argonne National Lab., IL). pp 433-462 of Nonlinear phenomena at phase transitions and instabilities. Riste, T. (ed.). New York, NY; Plenum Publishing Corp. (1982).

The nature off the crystalline state in two dimensions (2D) is reviewed, with particular emphasis on the form of the structure factor S(K) peculiar to 2D. Effects due to finite size are discussed, and it is shown that in most cases, this does not severely modify the expected power-law behavior for S(K) at most accessible wavevectors. The experimental determination of 2D solid and fluid phases in adsorbed monolayers is reviewed with particular reference to vapor-pressure isotherms, heat capacity and diffraction measurements. Results of diffraction studies of S(K) in the crystalline phase, and of the melting of incommensurate adsorbed monolayers and liquid crystal films are presented and discussed in the light of the Kosterlitz-Thouless theory of 2D melting. Finally, experiments on the lattice-gas-type melting of commensurate adsorbed monolayers are discussed with reference to theoretical expectations based on q-state Potts model calculations.

34154 Shear mechanical properties of free-standard liquid crystal films. Miyano, K. (Argonne National Lab., IL); Tarczon, J.C. pp 281-289 of Novel materials and techniques in condensed matter. Crabtree, G.W.; Vashishta, P. (eds.). New York, NY; Elsevier Science Publishing Co., Inc. (1982).

The mechanical shear properties of free-standing films of the liquid crystal BBOA (butyloxybenzylidene octylaniline) in the smectic-A and -B phases are interpreted in terms of an anomalous surface effect. It is suggested that such an effect may be common to film forming systems in general, and evidence is given to support this view.

34155 Limitations of MNDO and MNDO/CI computations of activation barriers. Engelke, R. (Los Alamos National Lab., NM). *Chemical Physics Letters;* **83**: No. 1, 151-155(1 Oct 1981).

The ability of MNDO and MNDO/CI for predicting activation barriers of unimolecular reactions is tested for decompositions of methane, ethane, nitromethane, and methyl nitrite. MNDO is not useful for this purpose; MNDO/CI gives energy barriers in agreement with experiment to about +-10 kcal/mole for the types of reactions considered. 2 figures, 1 table.

34156 Volume dependence of the elastic equation of state. 2. Solution-cured poly(dimethylsiloxane). Brotzman, R.W.; Eichinger, B.E. (Univ. of Washington, Seattle). *Macromolecules;* **14**: No. 5, 1445-1448(Sep-Oct 1981). Contract AT06-81ER10912.

Vapor sorption measurements for solution-cured poly(dimethylsiloxane) (PDMS) + cyclohexane are reported. The Flory-Huggins interaction parameter chi is found to be chi = 0.433 - 0.010 nu_s, where nu_s is the volume fraction of polymer. Differential solvent vapor sorption by cross-linked and un-cross-linked PDMS is reported as a function of volume fraction of solvent in the cross-linked PDMS. The elastic component of the solvent chemical potential is investigated as a function of the degree of dilation. Qualitative differences between bulk-cured and solution-cured samples are apparent, and Flory's recent theory of rubber elasticity accounts qualitatively for this behavior. 4 figures. 1 table.

34157 Asymmetric NMR spectra of weakly coupled nuclei: a common characteristic in the ^{13}C NMR spectra of [U-^{13}C] labeled molecules and in natural abundance proton-coupled ^{13}C spectra. London, R.E.; Walker, T.E. (Los Alamos Scientific Lab., NM). *Organic Magnetic Resonance;* **15**: No. 4, 333-338(1981).

Typically encountered proton-decoupled spectra of [U-^{13}C]-labeled molecules or proton-coupled spectra of natural abundance or singly labeled molecules contain many nuclei which satisfy the weak coupling approximation. The spectra of such nuclei are frequently asymmetric and often appear to exhibit the skewed intensity distribution characteristic of strongly coupled spins. Analysis of typical cases indicates that such effects arise in the presence of at least one moderately strong coupling interaction in the spin system (J/δ nu ~ 1/3), and the apparent intensity asymmetry reflects small differences in the spacing of unresolved components of the observed resonance. This effect is analogous to the case of virtual coupling in which weakly coupled spins cannot be analyzed as first order spectra; however, the ABX spin system which generally serves as a model for such systems does not predict the existence of spectral asymmetry for the X resonances. Prediction of this asymmetry requires a spin system of at least four spins with at least ABMX complexity, and can be treated generally using the effective Hamiltonian approach of Pople and Schaefer.

34158 ^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond. London, R.E.; Phillippi, M.A. (Los Alamos Scientific Lab., NM). *Journal of Magnetic Resonance;* **45**: 476-489(1981).

Carbon-13 spin-lattice relaxation rates were determined for 1,3,5-triphenylbenzene in $CDCl_3$ over a temperature range of 86°C, and the results interpreted in terms of the molecular dynamics. Dynamic models appropriate to the problem, including the effects of anisotropic motion and internal jumping between two or four states, were derived and the results evaluated comparatively for several different models. Similarities in the activation energies based on temperature-dependent measurements for all carbons suggests that either fortuitously similar barriers characterize both overall and internal motion, or that all relaxation rates depend primarily on a single type of motion, with the individual T_1 differences reflecting geometric factors. The latter interpretation leads to a rapid internal jump motion with a range of ~ 60°, as would be predicted on the basis of theoretical conformational energy calculations. Application of a four-state jump model in which the jump rates are assumed to depend on the 0 and 90° theoretically determined rotational barriers allow an estimation of the rates of internal motion consistent with the relaxation data. The physical basis for complex terms which occur in the bistable (and tristable) jump models is discussed.

34159 Effect of impurities on partial molal volume and critical micelle concentration of sodium dodecyl sulfate. Correction of micelle aggregation number. Doughty, D.A. (Bartlesville Energy Tech. Center, OK). *Journal of Physical Chemistry;* **85**: 3545-3546(1981).

To resolve discrepancy between values previously obtained for micelle aggregation numbers(N) and those obtained in a recent study, densities of aqueous solutions of sodium dodecyl sulfate (SDS) from several sources were measured. Included were two additional samples, one containing ca 2 wt % n-dodecyl alcohol and the other containing ca 2 at. % NaCl. Although the reason for the differences in N are not defined, the measurements indicate that the impurity is present in some of the SDS samples, and that it behaves as a long-chain alcohol. 1 figure.

34160 Modelling and scaleup of dispersed phase liquid-liquid reactors. Tavlarides, L.L. (Illinois Inst. of Tech., Chicago). *Chemical Engineering Communications;* **8**: 133-164(1981).

Two major areas of microscopic and macroscopic problems are addressed. The microscopic problem is concerned with the determination of the local rate of transfer of reactants and/or products between two phases. Results on chemical systems such as nitration, metal chelation processes, phase transfer catalytic reactions, are discussed. Various solutions of the microscopic problem are presented, and laboratory reactors used to determine kinetic models are included. The use of interactions or coalescence-redispersion models to describe dispersed phase micromixing and concomitant effects on conversion are demonstrated. 91 references, 14 figures, 3 tables.

34161 Activation of chemical reaction by impact of molecules on a surface. Connolly, M.S.; Greene, E.F.; Gupta, C.; Marzuk, P.; Morton, T.H.; Parks, C.; Staker, G. *Journal of Physical Chemistry;* **85**: 235-240(1981).

Molecules of C_2Cl_6, Cl_3CCHCl_3, CCl_4, and $W(CO)_6$ have been accelerated to speeds up to 1900 m s^{-1} in seeded molecular beams expanded from a nozzle and then suddenly brought to rest by collision with a glass surface. For $W(CO)_6$ there is a clear threshold near 1750 m s^{-1}, corresponding to a kinetic energy of 540 kJ mol^{-1}, above which the speeds became sufficient to cause reaction; for the chlorinated hydrocarbons much lower speeds caused reactions. The yields of volatile and nonvolatile products resulting from the impacts vary with the speed of the molecules and the temperature of the nozzle. This permits some comparison of the relative effectiveness with which the kinetic and internal energies of the molecules promote their reactions.

34162 Adsorption of propane on activated carbon at 25°C. Huang, J.C.; Forsythe, R.; Madey, R. (Kent State Univ., OH). *Carbon;* **19**: 234-235(1981).

Adsorption of propane on activated carbon at 25°C. The adsorption was measured over a concentration range fom 50 to 10,000 ppM. Different partial pressures of propane by mixing pure helium with calibrated propane-helium mixtures (with nominal concentrations of 100 ppM and 10,000 ppM). The fugacity of saturated propane was calculated from its vapor pressure as corrected by vapor-phase imperfection. The apparatus and experimental procedures were described earlier. The results were plotted. The ordinate is the adsorption capacity expressed as the number of moles of pro-

pane adsorbed per g of activated carbon; the abscissa is the square of the adsorption potential in units of cal per mole. A straight line was drawn through the five points measured with the 10,000 ppM propane-helium mixture. The straight line through the two points obtained with the 100 ppM mixture has the same slope but a different intercept. The discrepancy may be due to uncertainties in the concentrations of the calibrated gases. The solid line yields an intercept of 5.6×10^{-3} mole/g for monolayer coverage of propane. The surface area of activated carbon can be calculated from the monolayer surface coverage and the surface area occupied per mole. The value obtained was 1030 m^2/g.

34163 **Gas-solid chromatography of ethane on activated carbon at 25°C.** Huang, J.C.; Forsythe, R.; Madey, R. (Kent State Univ., OH). *Journal of Chromatography;* **214**: 269-282(1981).

The transmission of ethane was measured in a helium carrier-gas flow for ethane compositions between 50 and 10,000 ppM on activated carbon; the adsorption isotherm was derived at 25°C; the adsorption isotherm was incorporated into an asymptotic concentration profile formula. Analytical expressions are suggested as the criteria for an asymptotic profile. Long column length, a low diffusion coefficient, and a large curvature for the isotherm are necessary, however, the criteria cannot explain the small differences between results of different flow-rates for the same concentration. The effect of the mass-transfer resistance on the asymptotic concentration profile may require further investigation. 4 figures, 3 tables.

34164 **Herndon's structure-resonance theory. On the valence structure count for conjugated radical cations.** Randic, M.; Ruscic, B.; Trinajstic, N. (Iowa State Univ., Ames). *Croatica Chemica Acta;* **54**: No. 3, 295-308(1981).

Enumeration of valence structures for conjugated radical cations is of interest in estimating the first ionization potentials of conjugated hydrocarbons. Alternative routes for enumeration are reviewed and a novel method, based on the properties of the acyclic polynomials of conjugated structures, is outlined. The method is illustrated for several molecules and results reported for a number of conjugated systems involving either 14 or less carbon atoms.

34165 **Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives.** Meeks, J.; Wahlborg, A.; McGlynn, S.P. (Louisiana State Univ., Baton Rouge). *Journal of Electron Spectroscopy and Related Phenomena;* **22**: 43-52(1981).

The ultraviolet photoelectron spectra of benzoic acid and 20 of its derivatives are presented. The low-energy regions of these spectra are deconvoluted and assigned using chemical substitution effects. 5 figures, 3 tables.

34166 **Synthesis of three [(trifluoroethyl)amino]pyridines.** Bissell, E.R.; Swansiger, R.W. (Lawrence Livermore National Lab., CA). *Journal of Chemical and Engineering Data;* **26**: No. 2, 234-235(1981). Contract W-7405-ENG-48.

The synthesis of o-, m, and p-[(trifluoroethyl)amino]pyridine by diborane/tetrahydrofuran reduction of the corresponding trifluoroacetamide is described. The yields were 52%, 83%, and 76%, respectively. The synthesis, in 53% yield, of 2,2,2-trifluoro-N-(4-pyridyl)acetamide is also described.

34167 **Carbanion photooxidation at semiconductor surfaces.** Fox, M.A.; Owen, R.C. (Univ. of Texas, Austin). *ACS Symposium Series;* No. 146, 337-342(1981).

A series of experiments have demonstrated that the semiconductor interface is effective in inhibiting electron recapture in anion photolysis, in establishing mechanism in possible charge transfer photoreactions, and in acting as a catalytic surface in oxidative photocoupling reactions. 1 figure.

34168 **Supercomputer requirements for theoretical chemistry.** Walker, R.B.; Hay, P.J.; Galbraith, H.W. (Los Alamos National Lab., NM). *ACS Symposium Series;* No. 173, 47-63(1981).

Three areas of theoretical chemistry are surveyed. These areas include: (1) molecular electronic structure calculations; (2) chemical dynamics calculations; and (3) quantum optics and spectroscopy. Mathematical algorithms used to solve problems typical to each area are noted. Types of computers needed to solve these problems are described. Many problems which need to be studied are beyond the computing capabilities of these instruments. 11 figures.

34169 **Negative ion states of polyatomic molecules.** Christophorou, L.G. (Oak Ridge National Lab., TN). *ACS Symposium Series;* No. 162, 11-34(1981). Contract W-7405-ENG-26.

Recent work on the negative ion states of organic molecules formed in the field of the ground electronic state via a shape or a nuclear-excited Feshbach resonance mechanism is discussed. Electron scattering and electron attachment data on three basic groups of polyatomic organic molecules (nonaromatic double-bonded structures, benzene and benzene derivatives, selected halocarbons) are used to indicate the rather delicate and strong effects of molecular structure on the energy, cross section and lifetime of the negative ion states of organic molecules. The fragility of anionic species toward (multiple) fragmentation is shown using recent data on perfluorinated and other halocarbons.

34170 **Comprehensive mechanism for the Fischer-Tropsch synthesis.** Rofer-DePoorter, C.K. (Los Alamos National Lab., NM). *Chemical Reviews;* **81**: No. 5, 447-474(1981).

The Fischer-Tropsch synthesis is defined here as the catalytic polymerization and hydrogenation of CO to produce hydrocarbons and oxygenated products having various chain lengths. CO_2 and water are the side products. The approach to chemical reaction mechanisms is discussed in detail. The mechanism and supporting evidence for the elementary reactions are presented. The reactions of the mechanism are grouped by a time sequence in the synthesis, in the sense of following a single CO molecule through its possible reactions from adsorption on the surface to the formation of stable product molecules. Under steady-state conditions, all elementary reactions proceed simultaneously. The relation of this mechanism to other proposed mechanisms is discussed, and its relation to other synthesis-gas reactions is explored. 416 references, 12 tables.

34171 **Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts.** Moon, S.H.; Windawi, H.; Katzer, J.R. (Univ. of Delaware, Newark). *Industrial and Engineering Chemistry Fundamentals;* **20**: No. 4, 396-399(1981).

A new vacuum ir cell which is operable at 550°C and 10^{-6} torr for extended periods and devoid of contamination by organic vapor has been developed. The cell uses commercial vacuum adaptors as the ir window holders, which may be easily disassembled for sample introduction into the cell. The cell is compact, and no metal part is exposed to the internal gas stream. A basic design of the cell, procedures of the experiments, and some initial results to verify the cell performance are presented.

34172 **Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin.** Sengupta, P.K.; Kasha, M. (Florida State Univ., Tallahassee). *Chemical Processing (Chicago);* **68**: No. 2,3, 382-385(15 Dec 1979).

The yellow-green luminescence of 3-hydroxyflavone and quercetin at room temperature in solution arises from a tautomer of the molecules produced by excited state proton-transfer across a barrier in the double-minimum hydrogen-bonding potential. At 77 K in 2-methylbutane rigid matrix, a normal uv-violet fluorescence is observed in correspondence with the uv absorption. Excitation spectra and deuteration effects confirm the mechanism.

4004 Electrochemistry

REFER ALSO TO CITATION(S) 34090, 34125, 34192

34173 **(NP—3770064) Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$.** Gauglitz, H.J. (Hannover Univ. (Germany, F.R.). Fakultaet fuer Mathematik und Naturwissenschaften). 16 Dec 1980. 235p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83770064.

Portions are illegible in microfiche products; Thesis.

Electrochemical studies have been performed in sodium tetrachloroaluminate sulfue dioxide solvate at room temperature, in order to study how far the methods of voltametry, which are common in the field of electrochemical analysis of aqueous solution, can be used also for the aprotic solvate melts of the system considered here. For this purpose reference electrode systems are developed and micro-electrodes and electrochemical cells are modified to account for the zero humidity conditions. The systems Cu/CuCl, Ag/AgCl, and Au/$AuCl_3$ can be used as reference electrodes, which can directly be produced in Chloroaluminate-Solvate by anodic polarization of the metal. As a result of the current-voltage characteristic with platinum electrodes, a decomposition voltage of 3.20 V is obtained for the solvate. In addition chronopotentiometric measurements have been performed for solutions with iron(III)-chloride to determine the quarterwave-potential. Using a three-electrode set-up with platinum electrodes, diffusion boundary currents have been studied in iron(III)-chloride solutions together with the half-step-potential. With platinum, gold, silver, copper, and amorphous carbon electrodes boundary layer diagrams of the solvate have been determined by cyclic voltametric studies, showing large differences for the different electrode materials.

34174 **Electrochemical behavior of titanium.** Kelly, E.J. (Oak Ridge National Lab., TN). *Modern Aspects of Electrochemistry;* No. 14, 319-424(1982). Contract W-7405-ENG-26.

A brief topical review of the literature was presented to introduce the electrochemistry of titanium. It was based on the following conditions, titanium exhibits (1) an active state in which the metal is oxidized to form Ti(III) ions in solution, (2) a passive state in which the metal is covered with an oxide film, and in which the substrate metal is oxidized to form additional film and/or ti(IV) ions in solution, and (3) an active-passive transition region corresponding to the passivation process. This discussion related to the active and transition states rather than to the passive state. From an electrochemical viewpoint, titanium occupies an intermediate position between the typical valve metals (Zr, Nb, Ta, Hf, etc.) and the active-passive group of metals (Fe, Co, Ni, Cr, etc.). The following mechanistic studies of the electrochemical behavior of titanium were discussed; (1) monolayer mechanisms (2) phase-oxide mechanism and (3) miscellaneous concepts. As far as corrosion, titanium is generally healthy due to its unusual ability and propensity to produce its own curative. The mechanism for this feat involves (1) the active-state dissolution of the metal to form Ti(III) ions in solution, (2) the oxidation of the Ti(III) ions to form Ti(IV) ions in solution, and (3) the reduction at the active-state surface of the Ti(IV) ions, a curative process (autopassivation) resulting in the passivation of the active-state surface. The last two sections discussed noble metal alloys and the hydrogen evolution reaction. 241 references, 16 figures. (DP)

34175 **Use of carbamylated charge standards for testing batches of ampholytes used in two-dimensional elecrophoresis.** Tollaksen, S.L.; Edwards, J.J.; Anderson, N.G. (Argonne National Lab., IL). *Electrophoresis (Weinheim, Federal Republic of Germany);* No. 2, 155-160(1981). Contract W-31-109-ENG-38.

A method of testing batches of ampholytes is presented. By using carbamylated charge standards to co-electrophorese with the protein sample in the first-dimension isoelectric focusing gel, one can monitor, after running and staining the second-dimension sodium dodecyl sulfate (SDS) slab gel, the continuity of the pH gradient. Charge standards can also be used to check the reproducibility of the pH gradient among batches of ampholytes and to modify the new batch with a small amount of a narrow range ampholyte to assure reproducibility of experiments. Ampholytes for comparison were obtained from three major manufacturers. 5 figures.

34176 **Comparison of computer curve-fitting and graphical data evaluations of the galvanostatic relaxation technique for the measurement of kinetics of electrode reactions.** Nagy, Z. (Argonne National Lab., IL). *Electrochimica Acta;* **26**: No. 5, 671-679(1981).

The discussion can be summarized by stating that the computer curve-fitting data evaluation method for the galvanostatic technique is preferable to graphical data evaluation because: (1) it extends the technique's field of application to reactions about one order of magnitude faster; (2) it results in a more accurate determination of the exchange current density; and (3) it may potentially enable precise determination of the double layer capacitance and the diffusion parameter. 4 figures.

4005 Photochemistry

REFER ALSO TO CITATION(S) 33260, 33261, 34106, 34110, 34114, 34146, 34148, 34167, 34202

34177 **(BNL—32680) Photochemical energy conversion and solution kinetics.** Creutz, C.; Sutin, N. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 5p. (CONF-830614—1). NTIS, PC A02/MF A01. Order Number DE83008591.

From 7. DOE solar energy research conference; San Francisco, CA, USA (1 Jun 1983).

A major effort in the past two years has been the characterization of systems that effect the photo-oxidation of water to O_2 and/or mediate its photoreduction to H_2. The products of the spontaneous reduction of $Ru(bpy)_3^{2+}$ to $Ru(bpy)_3^{2+}$ in aqueous solutions have been analyzed by high performance liquid chromatographic and gas chromatographic methods. Some ten modified $Ru(bpy)_3^{2+}$-like complexes whose yields are a function of pH were identified and recovery of > 90% of the complex as $Ru(bpy)_3^{2+}$ was established. The photo-induced reaction of $Ru(bpy)_3^{3+}$ with water in strongly acid media also produces $Ru(bpy)_3^{2+}$, CO_2, and similar ring-modified products. The mechanism of H_2 formation from the reaction of water with $Co(bpy)_3^{+}$ and related complexes continues to be under active investigation. The outer-sphere electron transfer properties of strongly oxidizing nickel(III)-nickel(II) couples have been determined.

34178 **(LBL—15463) Question of mode-specificity in unimolecular reaction dynamics.** Miller, W.H. (Lawrence Berkeley Lab., CA (USA)). Jan 1983. Contract AC03-76SF00098. 22p. (CONF-830128—3). NTIS, PC A02/MF A01. Order Number DE83012469.

From International conference on photochemistry and photobiology; Alexandria, Egypt (5 Jan 1983).

Unimolecular decomposition following state-specific laser excitation is considered. If the transition state for the unimolecular reaction possesses any geometrical symmetry, then it is shown that this can lead to mode-specificity in the decay rates (i.e., different states with essentially the same total energy and angular momentum react at significantly different rates). This is illustrated for a model problem of two coupled oscillators (the Henon-Heiles potential) and also for the unimolecular dissociation of formaldehyde, $H_2CO \rightarrow H_2 + CO$, which has a planar transition state. Dynamical calculations indicate that there may also be a significant degree of mode-specificity for the formaldehyde reaction beyond that due to symmetry.

34179 **Singlet-singlet absorption spectra of diphenylpolyenes.** Chattopadhyay, S.K.; Das, P.K. (Notre Dame Univ., IN). *Chemical Physics Letters;* **87**: No. 2, 145-150(19 Mar 1982).

Intense absorptions due to singlet-singlet transitions are observed for three all-trans α,ω-diphenyl-substituted polyenes by nanosecond laser flash photolysis (337.1 nm). The absorption spectral maxima in cyclohexane are at 430 nm for 1,4-diphenyl-1,3-butadiene, 445 nm for 1,6-diphenyl-1,3,5-hexatriene, and 465 nm for 1,8-diphenyl-1,3,5,7-octatetraene. 3 figures, 1 table.

34180 **Photoprocesses in copolymers of methacrylophenone with methyl methacrylate: photodegradation and intramolecular energy migration.** Kilp, T. (Univ. of Notre Dame, IN); Guillet, J.E.; Galin, J.C.; Roussel, R. *Macromolecules;* **15**: No. 4, 980-985(1982).

A series of poly(methyl methacrylate-co-methacrylophenone) copolymers were photolyzed in fluid solution with 313-nm radiation. Apparent quantum yields of degradation increased from 0.001 to 0.083 as the ketone content of the copolymers increased

from 1.0 to 37.7 mol %. The magnitudes of these quantum yields are considerably lower than those previously reported for other methyl methacrylate-ketone copolymers. The depolarization of phosphorescence following excitation with plane-polarized light in 77 K solid solutions was measured as a function of copolymer composition. Results indicate that intramolecular energy transfer is a facile process in these systems. Migration of the excitation energy seems to be more dependent upon non-nearest-neighbor contacts between the ketone units than upon their presence in either dyad or triad sequences. 4 figures, 3 tables.

34181 **Photoelectron angular distributions from H_2 and D_2.** Southworth, S.; Brewer, W.D.; Truesdale, C.M.; Kobrin, P.H.; Lindle, D.W.; Shirley, D.A. (Lawrence Berkeley Lab., CA). *Journal of Electron Spectroscopy and Related Phenomena;* **26**: 43-51(1982). Contract W-7405-ENG-48.

The photoelectron asymmetry parameters of H_2 and D_2 have been measured using synchrotron radiation over the photon energy range 19 to 27 eV. The results are compared with previous measurements and several theoretical calculations. A few of the theoretical calculations are in good agreement with experiment, but most of them predict asymmetries which are too large. Essentially identical β values were measured for H_2 and D_2. This result is discussed in terms of differences which could arise due to vibrational and rotational structure.

34182 **Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen.** Suong, J.Y.; Carr, R.W. Jr. (Minnesota Univ., Minneapolis). *Journal of Photochemistry;* **19**: 295-302(1982). Contract AC02-76ER02026.

The 313 nm photolysis of 1,3-dichlorotetrafluoroacetone in the presence of oxygen was investigated at 298 K. CF_2O and CO_2 were identified as the reaction products, and a mechanism is proposed to explain their formation. Evidence is obtained for the formation of CO_2 by the reaction of CF_2ClO radicals with CO. 5 figures.

34183 **Temperature dependence of the lifetimes of the ligand-field states of tris(1,10-phenanthroline)iron(II).** Bergkamp, M.A.; Brunschwig, B.S.; Guetlich, P.; Netzel, T.L.; Sutin, N. (Brookhaven National Lab., Upton, NY). *Chemical Physics Letters;* **81**: No. 1, 147-150(1 Jul 1981).

The lifetimes of the excited states produced by 527 nm excitation of tris(1,10-phenanthroline)iron(II) have been measured in a 4:1 (v/v) ethanol/methanol mixture in the 14 to 259°K temperature range. The results are analyzed in terms of the $\leqq$ 10 ps population of ligand-field (LF) states from the initially generated metal-to-ligand charge-transfer (MLCT) states.

34184 **Laser-two-photon ionization of organic molecules in dielectric liquids.** Siomos, K.; Kourouklis, G.; Christophorou, L.G. (Oak Ridge National Lab., TN). *Chemical Physics Letters;* **80**: No. 3, 504-511(15 Jun 1981). Contract W-7405-ENG-26.

The ionization threshold of fluoranthene and of N,N,N',N-tetramethyl-p-phenylenediamine (TMPD) in n-pentane was determined by laser two-photon ionization (TPI) and found to be 4.50 +- 0.05 and 3.88 +- 0.05 eV respectively. For both molecules the TPI spectra show distanct structure due to autoionization. For fluoroanthene the TPI spectrum suggests that the molecule dissociatives via the first excited singlet state. 2 figures, 3 tables.

34185 **Ionization and excitation in non-polar organic liquids.** Lipsky, S. (Univ. of Minnesota, Minneapolis). *Journal of Chemical Ecology;* **58**: No. 2, 93-101(Feb 1981).

Information from 61 different sources is cited in this review article. Since rather comprehensive review articles were published about 10 years ago, this article describes some of the progress made in the field in the last 10 years. Emphasis of this review is on the nature of ionized and electronically excited states but is limited to features having some relevance to radiation chemistry. Some elementary concepts concerning the general nature of excited and ionized states are discussed. (BLM)

34186 **Radiotracer studies of unimolecular energy transfer.** Mathis, C.A.; Root, J.W. (Univ. of California, Davis). *Advances in Chemistry Series;* No. 197, 157-178(1981). Contract AM03-76SF00034.

Vibrationally excited $^{14}CH_3CF_3$ containing 102.8 +- 1.0 kcal mol^{-1} of excess energy has been produced via the photochemically initiated cross combination of $^{14}CH_3$ and CF_3 radicals in the gas phase. The samples contained dilute concentrations of $^{14}CH_3CO^{14}CH_3$ and CF_3COCF_3 photolysis precursors together with C_2H_6 or C_2F_6 host gases. The pressure dependences of the ($^{14}CH_3=$ $=CF_2$:$^{14}CH_3CF_3$) decomposition-stabilization product ratios were measured for these host substances throughout the range 0.5 $\leqq$ (D/S) $\leqq$ 1000 and then compared with the stepladder, Gaussian, and exponential theoretical transition probability models. None of the model calculations accounted for the qualitative characteristics of the extended range data, so that mathematically unique energy transfer models and $<\Delta E>$ values could not be assigned.

34187 **Photochemical properties of copper° complexes.** Ferraudi, G.; Muralidharan. (Univ. of Notre Dame, IN). *Coordination Chemistry Reviews;* **36**: 45-88(1981).

This review presented some of the principal features that are associated with the redox reactivity of the copper (I), copper (II) and copper (III) complexes. The emphasis was on the photochemistry of these complexes. Related subjects as their charge transfer spectroscopy and their thermal redox reactivity were also reviewed. The change transfer spectra of copper (II) complexes has been attributed to the population of charge transfer to metal, CTTM, and/or charge transfer to ligand, CTTL, states. Also, intraligand transitions, namely between ligand centered orbitals, can overlap with charge transfer transitions. The charge transfer spectra of copper (II) complexes can also be described in terms of the optical electronegativities, x. The large reducing tendency of copper (I) displaces the charge transfer to ligand transitions toward smaller energies than in copper (II). The photochemical properties of a number of complexes reveal that they undergo a photodissociation into a Cu (I) species and ligand redials. Such a behavior can be associated with the population of CTTM states. The systems reviewed were: halide complexes, carboxylate complexes, phenanthroline complexes, polyamine complexes, and diketonate complexes. Information was included for charge transfer photochemistry of copper (I), (II), and (III) complexes. 8 figures, 10 tables. (DP)

34188 **Orientation and energy transfer in chlorophyll monolayers diluted with hexadecane. Fluorescence and sensitized fluorescence.** Gonen, O. (Hebrew Univ., Jerusalem, Israel); Levanon, H.; Patterson, L.K. *Israel Journal of Chemistry;* **21**: 271-276(1981).

The fluorescence and force-area behavior of chlorophyll a (Chl a) monomolecular films diluted with hydrocarbon on an aqueous subphase is reported. It is found that the diluent hexadecane, instead of conventional fatty alcohols, results in a substantial increase in the fluorescence yield of Chl a. The luminescence intensity varies nonmonotonically with respect to the intermolecular distance. A model for the mutual orientation of the chlorophyll pigments and the consequent energy transfer processes in terms of a Foerster mechanism is proposed. For a random distribution of the Chl a molecules in the monolayer (kappa^2 = 2/3) an average value of 43° is calculated for the angle between the molecular planes and the water surface. This model yields a value of 23 A for the Foerster R_0. Also, a value of 58° is derived for the angle between the Q-band transition moment and the line of intersection between the molecular plane and water surface. When a mixture of Chl a and Chl b in the monolayers is being excited at the absorption band of the latter pigment, typical fluorescence of Chl a is being detected. This sensitization process can also be interpreted in terms of the orientational model of the Chl molecules as presented in this work.

34189 **Vibrational excitation in polyatomic molecules.** Galbraith, H.W.; Ackerhalt, J.R. (Los Alamos Scientific Lab., NM). pp 1-44 of Lasers-induced chemical processes. Steinfeld, J.I. (ed.). New York, NY; Plenum Publishing Corp. (1981).

Reactions of a polyatomic molecule driven by a high-power, resonant, infrared laser in a gaseous system at a low pressure are reported. Detailed calculations simulating the response of two species, SF_6 and S_2F_{10}, are presented. Published results of many experiments related to the multiphoton dissociation problem (mpe, mpd) of polyatomic molecules are reviewed with about 150 references being cited. The experiments are divided into four general classes: (1) molecular structure experiments; (2) multiple-photon absorption experiments; (3) dissociation experiments; and (4) two frequency experiments. (BLM)

34190 **147-nm photolysis of phosphine-silane mixtures.** Blazejowski, J.; Lampe, F.W. (Pennsylvania State Univ., University Park). *Journal of Photochemistry;* **16**: 105-120(1981). Contract AC02-76ER03416.

The 147 nm photochemistry of PH_3-SiH_4 mixtures was investigated at various ratios of the substrates such that more than 90% of the radiation was absorbed by pH_3. The photodecomposition of PH_3-siH_4 mixtures results in the formation of H_2, Si_2H_6, PH_2SiH_3 and P_2H_4 in the gas phase and a solid deposit which is probably a mixture of phosphorus and polymeric phosphorus silicon hydrides PSiH/sub x/. On photolyses of mixtures of the deuterated derivatives the analogous deuterated products are formed. The quantum yields for the gaseous products and for depletion of the substrates were measured. For the PH_3-SiH_4 system it was found that quantum yields depend on the composition of the reactant mixture and .on the light intensity of the incident radiation. When deuterated compounds were used significant changes in all quantum yields were observed. Parent-ion mass spectrometeric analysis of phosphorus- and silicon-containing volatile products indicates that PH_2SiH_3 is formed by two pathways: (1) combination of PH_2 and SiH_3 radicals; (2) insertion of SiH_2 to PH_3. A mechanism involving primary photodissociation of PH_3 is proposed which is in accord with the experimental observations as well as with our knowledge of the photochemistry of pure PH_3 and SiH_4. 6 figures, 2 tables.

34191 **Laser two-photon ionization spectroscopy of molecules in liquids.** Siomos, K.; Christophorou, L.G. (Oak Ridge National Lab., TN). *Chemical Physics Letters;* **72**: No. 1, 43-48(15 May 1980).

A two-photon ionization technique has been developed and applied to determine the photoionization threshold of a molecule in liquid solution. The photoionization of pyrene in n-pentane was studied by monitoring the photocurrent of an $\simeq 10^{-6}$ M solution as a function of the laser wavelength in the region 360 to 530 nm, corresponding to two-photon transition in the region 180 to 265 nm. The photoionization threshold thus determined is 4.80 +- 0.02 eV. Resonances were observed in the two-photon ionization spectrum which are tentatively ascribed to preionization of one-photon forbidden transitions to states energetically degenerate with the continuum, reached via two-photon absorption.

34192 **Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions.** Richardson, J.H. (Lawrence Livermore Lab., CA); Deutscher, S.B.; Maddux, A.S.; Harrar, J.E.; Johnson, D.C.; Schmelzinger, W.L.; Perone, S.P. *Journal of Electroanalytical Chemistry;* **109**: 95-114(1980). Contract W-7405-ENG-48.

A nitrogen laser and a nitrogen pumped dye laser have been used in a coulostatic electrochemistry experiment to characterize photoemission phenomena at a dropping mercury electrode. Time-resolved, transient voltage excursions following irradiation of a dropping mercury electrode by a single laser pulse were examined. Scavenging of the photoemitted electrons by N_2O was studied in aqueous and DMF solutions as a function of laser intensity, wavelength and electrode potential. The pH dependence of the NO^-_3 scavenging reaction was determined and compared to results obtained by other techniques. The complicated photoemission scavenging behavior of methyl viologen was studied. Earlier results with cw laser irradiation were confirmed and the importance of adsorption in the results of the laser coulostatic photoemission experiments was demonstrated. Preliminary results are reported for the effect of surfactants on photoemission.

34193 **Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions.** Richardson, J.H.; Deutscher, S.B.; Maddux, A.S.; Harrar, J.E.; Johnson, D.C.; Schmelzinger, W.L.; Perone, S.P. (Lawrence Livermore Lab., CA). *Journal of Electroanalytical Chemistry;* **109**: 95-114(1980). Contract W-7405-ENG-48;AC02-77ER04263.

A nitrogen laser and a nitrogen pumped dye laser have been used in a coulostatic electrochemistry experiment to characterize photoemission phenomena at a dropping mercury electrode. Time-resolved transient voltage excursions following irradiation of a dropping mercury electrode by a single laser pulse were examined. Scavenging of the photoemitted electrons by N_2O was studied in aqueous and DMF solutions as a function of laser intensity, wavelength and electrode potential. The pH dependence of the NO_3^- scavenging reaction was determined and compared to results obtained by other techniques. The complicated photoemission scavenging behavior of methyl viologen was studied. Earlier results with cw laser irradition were confirmed and the importance of adsorption in the results of the laser coulostatic photoemission experiments was demonstrated. Preliminary results are reported for the effect of surfactants on photoemission.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 33185, 34046, 34185

34194 (LBL—14986, pp 43-44) **Inclusive neutron production by energetic heavy ions.** Schimmerling, W.; Madey, R.; Anderson, B.D.; Cecil, R.A.; Tandy, P.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Although the dose contributions of secondary protons and neutrons are small (in most beams less than 3%), these particles are an important source of background radiation in and around the medical cave, and quantitative information concerning these particles is essential. Such information is especially important when sensitive tissues are close to the treatment area. On a more fundamental level, neutrons are a unique probe of nuclear structure, being insensitive to the Coulomb fields of nuclei. In a series of experiments performed at the Bevalac, the probability (differential cross section) of producing neutrons at a given energy and a given angle with respect to an incident heavy ion beams has been measured when nuclei in the beam interact with nuclei in targets of carbon, aluminum, copper, lead, and uranium.

34195 (LBL—14986, pp 47-49) **Radiological physics and chemistry.** Chatterjee, A.; Magee, J.L. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Studies made by the authors over the past several years on the fundamental nature of the chemical effects of high energy radiations have elucidated the role of track reactions and have called attention to the fact that there are also multitrack effects in many irradiated systems. Such effects are particularly expected in irradiated biological systems because radicals will usually be created with lifetimes longer than track lifetimes. We have studied, as an example, multitrack effects in the radiolysis of water because single track effects are so well known in water and experimental data are available for comparison with calculations based on our models. The principal objective is, of course, biological systems, and models are also being developed for the radiolysis of solutions of DNA.

34196 **Study of radical reaction kinetics by time-resolved ESR.** Fessenden, R.W.; Hornak, J.P. (Univ. of Notre Dame, IN). pp 345-352 of IUPAC: frontiers of chemistry. Laidler, K.J. (ed.). Oxford, England; Pergamon Press (1982).

The use of time-resolved ESR spectroscopy to study the kinetics and mechanism of reaction of radicals formed by pulse radiolysis is described. The method is of particular advantage over optical methods where the exact structure of the radical is in doubt or the optical absorption is weak. These advantages are illustrated by several radical conversions such as from the enol $^-O_2CC(OH)=CCO_2^-$ to $^-O_2CC(=O)CHCO_2^-$ and by studies of the polymerization of $H_2C=CCO_2^-$ with HC identical to CCO_2^-.

In addition, the two isomeric radicals formed by OH addition to p-hydroxybenzoate at the ortho and meta positions have been detected and their differing rates of dehydration and oxidation studied.

34197 **Evidence for the Br_2p reaction with Ni(III) macrocyclic complexes: Br_2^- as a possible reducing agent.** Morliere, P.; Patterson, L.K. (Notre Dame Univ., IN). *Inorganica Chimica Acta;* **64**: L183-L185(1982).

In this study, initial concentrations of bromine anion were comparable to those of Ni(II)(CR-2H) in solution were generated pulse radiolytically. Cr-2H represents the macrocyclic ligand. The loss of bormine anions via disproportionation has been taken into account. At pH 3.2, where these experiments were performed, rate constants of $2k_3 = 4.2 \times 10^9\ M^{-1}\ s^{-1}$ and $4.5\ M^{-1}s^{-1}$ were measured in solutions of 0.01 M and 0.001 M bromine anion. Theoretical decays at 360 nm may be calculated from k_1 and k_3, as well as the extinction coefficients for the various species involved.

34198 **ESR spectra and structure of the n-butane and n-hexane radical cations.** Wang, J.T.; Williams, F. (Univ. of Tennessee, Knoxville). *Chemical Physics Letters;* **82**: No. 1, 177-181(15 Aug 1981).

Well-resolved ESR spectra of the n-butane and n-hexane radical cations have been generated, each spectrum showing a 1:2:1 triplet and a detailed substructure. The results are interpreted in terms of an a/sub g/ singly occupied MO which is delocalized over the extended carbon chain (C/sub 2h/ symmetry) and two axial hydrogens.

34199 **Resonance Raman of viologen radicals.** Lee, P.C.; Schmidt, K.; Gordon, S.; Meisel, D. (Argonne National Lab., IL). *Chemical Physics Letters;* **80**: No. 2, 242-247(1 Jun 1981).

The resonance Raman effect of the radical cation of 4,4'-bipyridinium salts was recorded and correlated with the Raman spectra of the parent molecules. The radicals were produced either chemically or radiolytically. The correlation between the radical cation and its parent salt is then compared with the correlation between the radical anion of biphenyl and its parent molecule.

34200 **Principles and techniques of radiation chemistry.** Dorfman, L.M. (Ohio State Univ., Columbus). *Journal of Chemical Education;* **58**: No. 2, 84-87(Feb 1981). Contract AC02-76ER01763.

The physical processes involved in the deposition of energy were described and the principles relevant to these processes which are responsible for ionization and excitation of the components of the absorber system were identified. A brief description of some of the experimental technique in use in radiation chemical studies was given. Some examples of the application of the technique of pulse radiolysis to chemical kinetics were presented. Charged particle lose energy, in any absorber, through a series of Coulombic interactions with the electron of the atoms of the absorber. With electromagnetic radiation there are three principal energy loss processes which the incident photon undergoes. Ionizing radiation produces a variety of physical processes, namely: (a) ionization to form cationic species; (b) electronic excitation in optically allowed transitions; (c) electronic excitation in optically forbidden transitions; and (d) electron attachment to form anionic species. Some of the experimental techniques include optical absorption, conductance measurement by x-ray pulse, time-resolved electron spin resonance specroscopy, and time-resolved resonance Raman spectroscopy. Applications of pulse radiolysis include reactivity of organic ionic species in solution and reactivity of a series of five different carbenium ions with a variety of nucleophiles. 4 figures. (DP)

34201 **Free radicals generated by radiolysis of aqueous solutions.** Schwarz, H.A. (Brookhaven National Lab., Upton, NY). *Journal of Chemical Education;* **58**: No. 2, 101-105(Feb 1981).

The free radicals produced in the radiolysis of aqueous solutions span the range of redox potentials from -2.9 to +2.65 volts. The identity and nature of these radicals were discussed. Most of the discussion was results obtained with low LET radiation sources (^{60}Co gamma radiation or electron accelerators). Water radiolysis provides the synthesis of many radicals and radical ions in aqueous solution. The primary radicals, e/sub aq/$^-$ H, OH, are well characterized. The radical population can be made to be 90% pure OH (or O^-) if N_2O solutions are irradiated, the remaining 10% being H atoms. 55% of the radicals can be converted to H atoms in acid solution or in neutral phosphate solutions(e/sub aq/$^-$ reacts with $H_2PO_4^-$ to produce H). The remaining 45% (OH radicals) are difficult to convert to H by reaction with H_2, due to the slow rate of the reaction. About 100 atmospheres of H_2 are required to do the conversion in less than 10^{-6} sec. 3 figures, 3 tables. (DP)

34202 **Pattern formation in the Schloegl model of nonlinear kinetics.** Dung, M.H.; Kozak, J.J. (Univ. of Notre Dame, IN). *Physica A (Amsterdam);* **108**: 63-76(1981).

To study the effect of a local, spatial inhomogeneity on the progress of a chemical reaction which may exhibit a nonequilibrium phase transition, a (slightly) generalized version of a model proposed originally by Schoegl has been studied. Focusing on that regime of parameter space where the reaction sequence A + 2X reversible 3X and B + X reversible C allows a first-order transition, the consequences are considered of introducing a spatially-varying diffusion coefficient characterized by a correlation length which calibrates the region over which the spatial inhomogeneity persists. It is found that if the inhomogeneity is localized, only small quantitative differences are found between the exact solution reported earlier by Schloegl and the solution generated here. However, as the correlation length becomes larger, abruptly at a certain critical value, a qualitative change in the nature of the solutions is found, with apparent oscillation produced in the concentration variable of the problem. This behavior is interpreted as indicating the onset of pattern formation, and suggest that this behavior may be of importance in those radiation-induced phenomena where high-energy intermediates are produced.

34203 **Fast reaction studies of organic ions in solution.** Dorfman, L.M. (Ohio State Univ., Columbus). pp 95-109 of Fast reactions in energetic systems. Capellos, C.; Walker, R.F. (eds.). Dordrecht, Netherlands; D. Reidel Publishing Company (1981). Contract AC02-76ER01763.

The reactivity of organic ionic species in solution has been investigated by the pulse radiolysis technique. A brief discussion of some of the relevant features of ionization and electronic excitation by high energy electrons will be presented. The techniques of the fast reaction method will be described, along with its application to some of the systems which have been investigated. Various organic ionic species such as aromatic radical anions, radical cations, carbanions and carbocations have been selectively generated and their reactivity determined. The reactivity of a series of phenylcarbenium ions with halide ions, with alkyl amines, and with alkenes will be discussed.

34204 **Optical studies of hydronaphthyl radicals embedded in dihydronaphthalene crystal.** Nakayama, T.; Sheng, S.J. (Univ. of Notre Dame, IN). *Molecular Crystals and Liquid Crystals;* **69**: 199-206(1981).

Radiation-induced radicals in dihydronaphthalene have been investigated at 4.2 K by absorption, fluorescence and fluorescence excitation studies. It was shown that the radicals in dihydronaphthalene are hydronaphtyl radicals. The advantages of using the dihydro compounds in the identification of cyclohexadienyl type radicals is discussed. 2 figures, 1 table.

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 33991, 34513, 34544, 34545, 34678

34205 **(CONF-830419—7) X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI.** Haire, R.G.; Young, J.P.; Peterson, J.R. (Oak Ridge National Lab., TN (USA); Tennessee Univ., Knoxville (USA). Dept. of Chemistry). 1983. Contract W-7405-ENG-26. 13p. NTIS, PC A02/MF A01. Order Number DE83011402.

From 16. rare earth research conference; Tallahassee, FL, USA (18 Apr 1983).

The anhydrous tri-iodides and the oxyiodide of americium were investigated by X-ray diffraction and absorption spectrophotometry. From the X-ray analysis of the tri-iodide, an orthorhombic form ($PuBr_3$-type structure) has been identified, which is isostructural with the lighter actinide (U-Pu) tri-iodides. A hexagonal form (BiI_3-type structure) of the tri-iodide was also found. The transition temperature for converting the orthorhombic form to the hexagonal form was established to be 400 +- 30°C. Room temperature lattice parameters for the tri-iodide are: (1) a_0 = 0.428(4), b_0 = 1.394(1) and c_0 = 0.9974(7) nm for the orthorbombic form; and (2) a_0 = 0.7637(4) and c_0 = 2.091(2) nm for the hexagonal form. Tetragonal parameters for the oxyiodide are a_0 = 0.4010(3) and c_0 = 0.9038(6) nm. From differences in the absorption spectra of the solids at 25°C, it is possible to differentiate between these three materials by absorption spectrophotometry.

34206 (LBL—14986, pp 34-37) **New sequestering agents for the actinides.** Durbin, P.W.; Jeung, N.; Rodgers, S.J.; White, D.L.; Raymond, K.N. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

This a cooperative research project of the Biology and Medicine and the Materials and Molecular Research Divisions, LBL, and the Department of Chemistry, UC Berkeley. Its purpose is to develop safe effective agents for decorporation of actinides and other toxic metal ions of small size and high charge. The similar coordination chemistries of Fe(III) and Pu(IV) suggested that ligands forming stable chelates with Fe(III) would also be effective for Pu(IV). Several ligands containing the catechoyl (2,3-dihydroxybenzoic acid) functional groups have been prepared at LBL.

34207 **Synthesis and structure of dicyclopentenouranocene $U[C_5H_6(CH_2)_3]_2$.** Zalkin, A.; Templeton, D.H.; Luke, W.D.; Streitwieser, A. Jr. (Lawrence Berkeley Lab., CA). *Organometallics;* 1: No. 4, 618-622(1982). Contract W-7405-ENG-48.

The title compound 1 was synthesized by the reaction of dipotassium bicyclo[6.3.0]undeca-2,4,6-triene-1,8-diide, 3, and UCl_4, and its crystal and molecular structure was determined by single-crystal x-ray diffraction. The compound crystallizes in the orthorhombic space group Pbca with eight molecules in the unit cell with dimensions a = 17.393 (8) A, b = 22.468 (12) A, and c = 8.931 (4) A. The uranium atom is located centrally between the two eight-membered rings with bond distances U-C = 2.64 +- 0.03 A and C-C = 1.40 +- 0.02 A. The effects of annulation on the physical properties of uranocene are discussed.

34208 **Recoil generated radiotracers in studies of molecular dynamics.** Spicer, L.D. (Univ. of Utah, Salt Lake City). *Advances in Chemistry Series;* No. 197, 123-145(1981). Contract AC02-76ER02190.

From 178. meeting of the American Chemical Society; Washington, DC, USA (10 Sep 1979).

This chapter summarizes many of the contributions that the recoil technique of generating excited radiotracer atoms in the presence of a thermal environment is making to the field of chemical dynamics. Specific topics discussed critically include characterization of the generation and behavior of excited molecules including fragmentation kinetics and energy transfer, measurement of thermal and hot kinetic parameters, and studies of reaction mechanisms and stereochemistry as a function of reaction energy. Distinctive features that provide unique approaches to dynamical problems are evaluated in detail and the complementarity with more conventional techniques is addressed. Prospects for future applications are also presented.

34209 **Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons.** Root, J.W. (Univ. of California, Davis); Manning, R.G. *Advances in Chemistry Series;* No. 197, 80-122(1981). Contract AM03-76SF00034.

The principal goals of ^{18}F hot atom chemistry research involve the identification and study of energetic reaction pathways and the elucidation of the properties of the labeled products formed from such reactions. The salient features of this research carried out with halocarbon reagents during the past 10 years are summarized within the context of these two major areas of emphasis. 103 references.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

34210 **(AD-A—124046/4) Mechanisms of smoke reduction in the high-pressure combustion of emulsified fuels. Volume II. Experimental and theoretical study of evaporating emulsified and neat fuel sprays. Annual progress report No. 2, 29 September 1980-29 September 1981.** Dodge, L.G.; Moses, C.A. (Southwest Research Inst., San Antonio, TX (USA)). Dec 1982. 77p. (SWR—6287/2). NTIS, PC A05/MF A01.

This report documents progress made during the second year of a three-year study of the atomization and evaporation characteristics of emulsified and alternative fuels at conditions typical of those found in gas turbine engines. The development of experimental techniques suitable for drop size measurements in realistic polydisperse fuel sprays in high pressure/temperature air has been the first goal of this year's program. The second area of interest has been the development of detailed drop models which predict the heat-up, evaporation, and trajectory of fuel sprays and the resulting size distribution parameters. In addition to these two areas, a facility was constructed during the first year of this program to allow for the containment of sprays in high pressure/temperature moving air with optical access for spray size measurements. These experimental and analytical tools have and will continue to be used to study the differences in atomization/evaporation of emulsified and neat fuels, and various other fuels at interest to the U.S. Navy.

34211 **(AD-P—000308/7) Study on the ignition of a fuel droplet in high temperature stagnant gas.** Yoshizawa, Y.; Tomita, M.; Kawada, H. (Tokyo Inst. of Tech. (Japan). Dept. of Mechanical Engineering). Jul 1981. 8p. NTIS, PC A02/MF A01.

This study aimed to clarify the effects of the fuel vapor, which had evaporated in advance and formed combustible mixture around the condensed phase, on the ignition of a fuel droplet under the gas dynamic compression. A soap bubble was utilized to make a heterogeneously distributed fuel vapor pocket in oxidizer gas which offered a model of the vapor cloud around the fuel droplet. Induction periods for the onset of strong emission were measured for fuel droplets, and the models and their ignition processes were examined precisely by means of the interferometric measurement of the fuel concentration field.

34212 **(LBL—15799) Effects of transient combustion phenomena on molecular-beam sampling.** Lucas, D.; Peterson, R.; Hurlbut, F.C.; Oppenheim, A.K. (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 28p. (CONF-830429—2). NTIS, PC A03/MF A01. Order Number DE83011674.

From Combustion Institute spring technical meeting; Pasadena, CA, USA (11 Apr 1983).

The measurement of transient events with a molecular beam mass spectrometer is often difficult due to the rapid and large changes in temperature, pressure, and chemical composition encountered in a reacting mixture during combustion processes. How results arising from varying the source parameters under steady-state conditions can be used in interpreting data from a flash-initiated combustion mixture are being studied. Time of arrival curves from heated argon beams are measured and compared to curves calculated using an algorithm based on a physical modeling of the time-of-flight process. Results indicate that the source temperature determines the peak arrival time, and that the beam half-width is essentially constant during a typical combustion event. These results are then applied to a reacting $H_2/O_2/NO_2/Ar$ system.

42 ENGINEERING

4201 General Engineering

34213 (LA-UR—83-147) Programmable calculator stress analysis. Van Gulick, L.A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 23p. (CONF-830607—2). NTIS, PC A02/MF A01. Order Number DE83006055.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Portions are illegible in microfiche products.

Advanced programmable alphanumeric calculators are well suited for closed-form calculation of pressure-vessel stresses. They offer adequate computing power, portability, special programming features, and simple interactive execution procedures. Representative programs that demonstrate calculator capabilities are presented. Problems treated are stress and strength calculations in thick-walled pressure vessels and the computation of stresses near head/pressure-vessel junctures.

34214 (UCID—19795) Field evaluation of tank track-pad failures. Lesuer, D.R.; Santor, S.D.; Cornell, R.H.; Patt, J. (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 39p. NTIS, PC A03/MF A01. Order Number DE83011943.

This report describes a series of experiments that were performed at the Yuma Proving Grounds to better understand the problem of track pad failures. In one series of tests, high speed motion photography was used to study the deformation and operational characteristics of the T142 track. In another series of tests, the temperature buildup in pads was studied on the T142 track. Testing was done on the paved, gravel, and cross-country courses at Yuma. The results of the movie studies show that significant tensile stresses were introduced into the pads as they scrubbed over obstacles. Localized loads and large applied shear stresses introduced during turning operations can also cause tensile stresses. We believe these factors have a dominant role in the cutting and chunking process. The temperature data was taken for the surface as well as the interior of the pad and showed that high temperatures can be produced in track pads. There is also a large temperature difference between tests run on the three courses. These differences were shown to be due to the different heat generation rates produced on these three courses.

34215 (UCRL—89005) Analysis of circumferential cracking in hydroformed bellows. Streit, R.D. (Lawrence Livermore National Lab., CA (USA)). Mar 1983. Contract W-7405-ENG-48. 8p. (CONF-830607—10). NTIS, PC A02/MF A01. Order Number DE83009122.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Bellows are used in piping systems to accommodate differential displacements between various points while still maintaining pressure integrity. In hydroforming these elements, however, high tensile residual stresses can develop, which, in combination with the normal operating stresses, may lead to circumferential cracking. The stresses arising from different loading conditions are calculated for a specific bellows configuration, and the stress-intensity factors (SIF) for circumferential cracks in these stress fields are evaluated. The stress-intensity factors in the bellows are about 15% less than the values calculated for a crack in a straight pipe of similar geometry. The reduction in the SIF is believed to be due to the increased circumferential stiffness resulting from the formation of the convolutions.

4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 33134, 34258, 34309, 34314, 34319, 34666

34216 (BMFT-FB-T—82-159) Development up to the construction stage of a quasiliquid surface storage, in particular for a liquid gas, ball thrust container. Frese, E.; Averdiek, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 234p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83750067.

The objective of this research work was to investigate and determine theoretically or analytically the strain and buckling behaviour of spherical pressure vessels with special ground support, in order to improve construction and fabrication of pressure vessels with regard to strain and stress conditions.

34217 (DFVLR-FB—82-25) Generation of higher levels of turbulence in the test section of the High Speed Cascade Wind Tunnel Braunschweig for simulation of turbomachinery conditions. Kiock, R.; Laskowski, G.; Hoheisel, H. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)). Mar 1982. 54p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750855.

Portions are illegible in microfiche products.

The flow through a turbomachine is characterized by a strong turbulence. Periodic velocity changes are superposed by stochastic velocity fluctuations, and the degree of turbulence achieves values up to 20%. A similar turbulence should be simulated at the investigation of cascades in the wind tunnel. For this purpose, turbulence was generated by grids of crossed bars in the High Speed Cascade Wind Tunnel Braunschweig. Now a turbine cascade can be investigated in its design point with a degree of turbulence of Tu_1 = 0.8%/3.1%/5.6% and 7.9% defined in the cascade inlet plane. Considerably higher values can be achieved only in the case of increasing inhomogeneous distribution of dynamic head and turbulence across the test section.

34218 (Juel-Spez—142) Impact tests with fuel element cans. Haas, H.; Delis, K.; Wolf, W.; Engelstaedter, R. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung Allgemeine Technologie). Mar 1982. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750077.

Impact tests with storage tanks for irradiated HTR-fuel balls have been carried out. The determination of the damages of the storage tanks falling from a heigth of 7 m and the graphite balls, which have been used in place of the fuel elements, has been the aim of these tests. The main results are: 1. The leakage of the three impact tested tanks (2 of type ASSE, 1 of type AVR-TL) has not increased due to the impact. 2. The deformation of the tanks caused by the impact exceed the tank specification for dimensions and shape. 3. The graphit ball damages depend on the type of tank and on the angle of impact. The damages of graphit balls in the tank of type AVR-TL have been neglectable small.

34219 (KFK-CAD—202) Program for the ultimate static load of spatial steel frames. Sedlacek, G.; Lopetegui, J.; Saleh, A.; Stutzki, C. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Mar 1982. 123p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750376.

To consider the general behavior of the structure when reaching the limit state, the acting forces are gradually increased in controlled steps. Plastic zones which can occur at any part of the structure are regarded by using an ideal elastic-plastic stress-strain relation. The effects of the warping stiffness of the beam elements and those of eccentrically applied loads are taken into account. The behavior of any member of the structural system due to flexural-torsional buckling is also considered within the systems analysis, thus meeting the requirements of the German draft-standard (DIN 18800, Part 2).

34220 (LA-UR—83-1251) Theory of an active magnetic regenerative refrigerator. Barclay, J.A. (Los Alamos National Lab., NM (USA)). 1982. Contract W-7405-ENG-36. 15p. (CONF-821237—1). NTIS, PC A02/MF A01. Order Number DE83011184.

From 2. biennial conference on refrigeration for cryogenic sensors and electronic systems; Greenbelt, MD, USA (7 Dec 1982).

The adiabatic temperature change with field is limited to about 2 K/Tesla for ferromagnets near their Curie temperatures by the change of magnetization with temperature and the lattice heat capacity. Hence, practical magnetic refrigerators operate on a regenerative cycle such as the Brayton cycle. One way to execute this cycle is through the use of an active magnetic regenerator, i.e. a regenerator composed of magnetic material that is cycled in an out of a magnetic field with appropriate fluid flows. The theory of

these devices can be predicted by solving the partial differential equations that describe fluid and the magnetic solid. The active magnetic regenerator is described along with the method of calculation. Temperature profiles for a normal regenerator and a magnetic regenerative refrigerator are shown.

34221 **(N—8230497) Thermal insulation blanket material. Final Report.** Pusch, R.H. (Woven Structures, Inc., Compton, CA (USA)). Jun 1982. 10p. (NASA-CR—166367). NTIS, PC A02/MF A01.

A study was conducted to provide a tailorable advanced blanket insulation based on a woven design having an integrally woven core structure. A highly pure quartz yarn was selected for weaving and the cells formed were filled with a microquartz felt insulation.

34222 **(SAND—82-2172) Design of a redundant-load-path lifting fixture for the Clinch River Breeder Reactor Plant spent-fuel shipping cask.** Lamoreaux, G.H.; Eakes, R.G.; Pope, R.B. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 16p. NTIS, PC A02/MF A01. Order Number DE83011864.

A newly developed concept for a redundant-load-path lifting fixture for spent fuel shipping casks is presented. The concept addresses remote attachment of the crane hook to the lifting fixture and remote attachment of the lifting fixture to this cask, and also allows the cask to be rotated from its shipping position to the vertical and lifted from its transport vehicle without requiring hands-on action.

34223 **(SAND—83-0002C) Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 10p. (CONF-830528—2). NTIS, PC A02/MF A01. Order Number DE83011496.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

For a radioactive materials package, correlations between possible aperture size (the opening or fault induced by environmental testing) and radioactive material sizes are useful to confirm test evidence when that evidence demonstrates no loss or very small loss of radioactive material through specific seals and joints at measured leak rates. For the smaller leak rates that were actually measured following severe tests of containment vessel seals, such as 10^{-5} atm cm^3/s, the approximated fault or aperture (crack height in the seal) is molecular and sub-particulate in size. Containment was predicted and was achieved. In the case of well designed seals and joints for the containment of radioactive materials, very large leak rates (such as 10^{-2} to 10^{-4} atm cm^3/s air or helium) may be associated with a fault or aperture (crack height in the seal) that is still smaller than the particulate size of the solid-form radioactive material being contained. In a specific case, containment was predicted and was achieved. This indicates that large post-accident-test gas leak rates in radioactive materials packagings, when associated with a well-designed seal and joint, may be supportive of the adequate containment of radioactive materials.

34224 **(SAND—83-0003C) Quality assurance in packaging design through the peer review process.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 6p. (CONF-830528—3). NTIS, PC A02/MF A01. Order Number DE83011498.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

The formulation of a peer design review group, the method for accomplishing the study, and the organization and scope of the task are presented by using the recently accomplished TRUPACT preliminary design peer review as a case study.

34225 **(SAND—83-0352C) Analytical and experimental studies on penetration into geological targets.** Forrestal, M.J.; Longcope, D.B.; Lee, L.M. (Sandia National Labs., Albuquerque, NM (USA); Ktech Corp., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 4p. (CONF-830519—2). NTIS, PC A02/MF A01. Order Number DE83007295.

From Symposium on the interaction of non-nuclear munitions with structures; Colorado Springs, CO, USA (10 May 1983).

This paper summarizes some recent analytical and experimental work on penetration into geological targets. Results from several elastic-plastic type theoretical models which predict forces on penetrators for normal impact into dry porous rock, concrete, and sea ice targets are presented and compared with measurements from field tests. Rigid-body acceleration data from newly developed laboratory scale experiments for impact velocities between 0.2 and 1.2 km/s are also presented.

34226 **(SAND—83-0738) Emulation of multi-axis numerically controlled machine tools.** Burd, W.C. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 24p. NTIS, PC A02/MF A01. Order Number DE83011937.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The MULTAX-PLOT program provides a method for verification of numerical control part programs. Combined with other tools, such as postprocessor listings and center line (CL) pen plots generated from the CL data files, the interactive MULTAX-PLOT program provides the machinist, the parts programmer and the postprocessor implementor a tool to visualize and troubleshoot machining commands. The MULTAX-PLOT program fills a significant void in the numerically controlled (NC) machining process. The center line pen plots are made from the CL data by one postprocessor, whereas the machine command file is generated by a different postprocessor. These two postprocessors may not produce identical results. However, the MULTAX-PLOT program displays the data from the machine tool's command file that will actually drive the machine tool. The principle benefits of the MULTAX-PLOT program are: A reduction in verification times by the system programmers, the NC parts programmers and the machnists; An early error detection method that reduces possible machine tool damage and scrapped parts; and Improved machine tool utilization. MULTAX-PLOT has been implemented and has aided in the development of two multi-axis postprocessors. It has proved to be a powerful diagnostic tool for the postprocessor implementor. The parts programmers and machinists have had favorable results with their initial use of MULTAX-PLOT for verification. However, the full potential of MULTAX-PLOT will be realized as terminals are installed at the NC machine tools.

34227 **Comments on resolution of coherent sources incident on a circular antenna array.** Miller, E.K. (Lawrence Livermore Lab., CA). *Proceedings of the IEEE (Institute of Electrical and Electronics Engineers);* **69**: No. 1, 122-123(Jan 1981).

In the above letter, a technique is presented for using a circular array of N equally spaced antennas to obtain the azimuths and strengths of M ($M \leq N/2$) far-field sources. The procedure involves two basic steps: (1) use of a FFT (assuming N is a power of 2) to transform the N individual antenna-element strengths; (2) solution of an Mth-order linear system composed of the transformed data to find the coefficients of an Mth-order polynomial whose roots provide the azimuth angles. It is the purpose of this brief letter to mention that step 2 above is identical to Prony's Method, a procedure which underlies much of modern signal processing.

4203 Lasers

REFER ALSO TO CITATION(S) 34940, 34941, 34942

34228 (CONF-830130—, pp 261) **Heavy ion beam pumped He-Ar, He-Xe, and Ar-Xe gas lasers.** Ulrich, A.; Bohn, H.; Kienle, P.; Perlow, G.J. (Technische Universitaet Muenchen, Germany). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

A 100 MeV ^{32}S-beam of 300 W maximum power at 12.5% duty factor was used to pump the following lines of inert gas lasers: Ar I (1.27 μm, 1.79 μm) in He-Ar, Xe I (1.73 μm, 2.03 μm) in Ar-Xe and Xe I (2.03 μm) in He-Xe. The experimental setup is shown.

34229 **(SAND—83-0283) Study on the E-beam pulse width scaling for a 25-kilojoule KrF amplifier.** Ramirez, J.J. (Sandia National Labs., Albuquerque, NM (USA)). Feb 1983. Contract AC04-76DP00789. 54p. NTIS, PC A04/MF A01. Order Number DE83012296.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The KrF laser is being considered as an ICF driver candidate. Since this laser is not an energy storing system, the output energy of an amplifier is delivered over the entire pulse width of the excitation source. E-beam pumping is preferred for large energy systems. The e-beam pulse width is constrained to a few hundred nanoseconds by laser operation and pulsed power considerations. The target requires pulses of a few nanoseconds. Angular multiplexing of probe beams through the amplifier is a preferred scheme for bridging this difference in timing requirements. Progressively shorter target irradiation times may be obtained by using shorter pulse probe beams and by either increasing the number of angular multiplexed beams or by decreasing the e-beam pulse width. This report documents results of a study on the consequences of following the latter approach.

4204 Heat Transfer And Fluid Flow

REFER ALSO TO CITATION(S) 33724, 33975

34230 **(BNL-NUREG—32897) Study of momentum transfer in two-fluid formulation of two-phase flow.** Egely, G.; Saha, P. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 23p. (CONF-830439—4). NTIS, PC A02/MF A01 - GPO. Order Number DE83011651.

From 3. multi-phase flow and heat transfer symposium; Miami, FL, USA (18 Apr 1983).

Advanced nuclear-safety codes such as TRAC and RELAP5 use two-fluid hydraulic models. However, there are uncertainties for the application of different correlations. This paper intends to show the effects and importance of a number of correlations for wall friction, interphase drag, and virtual mass. It has been shown that the homogeneous wall-shear model yields good results up to the annular-flow regime, the single-bubble drag correlation is acceptable, and the inclusion of virtual mass coefficient is helpful. (It has been found that the critical Weber number is not appropriate for bubble radius calculation; it predicts an opposing tendency when compared with the test data. Also, a two-phase diffuser efficiency is required for diverging ducts and a correlation for the same has been proposed.

34231 **(LA-UR—83-1080) Performance limits for smooth-wall gravity-assisted heat pipes.** Prenger, F.C.; Kemme, J.E.; Groll, M.; Spendel, T. (Los Alamos National Lab., NM (USA); Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). 1983. Contract W-7405-ENG-36. 5p. (CONF-830629—2). NTIS, PC A02/MF A01. Order Number DE83011324.

From 18. AIAA thermophysics conference; Montreal, Canada (1 Jun 1983).

Performance limits for vertical, smooth-wall heat pipes were obtained from experiments performed at the IKE of the University of Stuttgart and at the Los Alamos National Laboratory. The data are correlated with parameters derived from flooding in countercurrent, two-phase flows. Tests using smooth-walled, wickless heat pipes demonstrate the applicability of two-phase flow correlations for predicting performance limits in gravity-assisted heat pipes.

34232 **(N—8230368) A model analysis of separation initiated external combustion in supersonic flow over a flat plate.** Sun, Y.C. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Goettingen (Germany, F.R.)). Nov 1981. 56p. (DFVLR-FB—82-04). NTIS, PC A04/MF A01.

A simple model based on experimental results is analyzed for the flow configuration caused by lateral injection of secondary medium into a primary supersonic flow and further by initiating external combustion in front of a jet spoiler. Despite the uncertainty of the burnt fraction of fuel, analytical results are obtained which indicate the flow conditions. From the simple model analysis, it becomes evident that relatively high coefficients of lateral force are attainable for a jet spoiler coupled with external combustion.

34233 **(N—8231642) Flow process in combustors.** Gouldin, F.C. (Cornell Univ., Ithaca, NY (USA)). Jun 1982. 16p. (NASA-CR—169294). NTIS, PC A02/MF A01.

Fluid mechanical effects on combustion processes in steady flow combustors, especially gas turbine combustors were investigated. Flow features of most interest were vorticity, especially swirl, and turbulence. Theoretical analyses, numerical calculations, and experiments were performed. The theoretical and numerical work focused on noncombusting flows, while the experimental work consisted of both reacting and nonreacting flow studies. An experimental data set, e.g., velocity, temperature and composition, was developed for a swirl flow combustor for use by combustion modelers for development and validation work.

34234 **(N—8231643) Investigations of flowfields found in typical combustor geometries.** Lilley, D.G. (Oklahoma State Univ., Stillwater (USA)). Jul 1982. 252p. (NASA-CR—169295). NTIS, PC A12/MF A01.

Experimental and theoretical research undertaken on 2-D axisymmetric geometries under low speed, nonreacting, turbulent, swirling flow conditions is reported. The flow enters the test section and proceeds into a larger chamber (the expansion ratio D/d 2) via a sudden or gradual expansion (sidewall angle alpha 90 and 45 degrees). Inlet swirl vanes are adjustable to a variety of vane angles with values of phi 0, 38, 45, 60 and 70 degrees being emphasized.

34235 **(N—8231646) Studies of implicit and explicit solution techniques in transient thermal analysis of structures.** Adelman, H.M.; Haftka, R.T.; Robinson, J.C. (National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center). Aug 1982. 47p. (NASA-TP—2038; L—15245). NTIS, PC A03/MF A01.

Studies aimed at an increase in the efficiency of calculating transient temperature fields in complex aerospace vehicle structures are reported. The advantages and disadvantages of explicit and implicit algorithms are discussed and a promising set of implicit algorithms with variable time steps, known as GEARIB, is described. Test problems, used for evaluating and comparing various algorithms, are discussed and finite element models of the configurations are described. These problems include a coarse model of the Space Shuttle wing, an insulated frame test article, a metallic panel for a thermal protection system, and detailed models of sections of the Space Shuttle wing. Results generally indicate a preference for implicit over explicit algorithms for transient structural heat transfer problems when the governing equations are stiff (typical of many practical problems such as insulated metal structures). The effects on algorithm performance of different models of an insulated cylinder are demonstrated. The stiffness of the problem is highly sensitive to modeling details and careful modeling can reduce the stiffness of the equations to the extent that explicit methods may become the best choice. Preliminary applications of a mixed implicit-explicit algorithm and operator splitting techniques for speeding up the solution of the algebraic equations are also described.

34236 **(N—8231657) Pressure losses in pneumatic transport. A model based on particle-wall interactions and particle density distribution.** Ottjes, J.A. (Technische Hogeschool Delft (Netherlands)). Jun 1982. 119p. (WTHD—145). NTIS, PC A06/MF A01.

An experimentally verified model which calculates pressure losses originating from dilute phase pneumatic transport of coarse particles in the horizontal stationary flow regime is presented. The model is based on the balance of drag and frictional forces on particles. The particles are characterized by their terminal velocity, the particle-wall sliding friction coefficient and the coefficient of restitution between particles and wall. The influence of the inhomogeneous particle distribution in the pipe is taken into account, by a particle density distribution, which resembles the barometric height formula. A Froude number, based on the mean square value of the radial particle-velocity component, is used as an empirical parameter. This number increases with increasing average air velocity, but perhaps depends on pipe diameter and solids-mass flow. The assumption of a linear relationship between the Froude number and the average air velocity provides scaling and predicting possibilities for pressure losses.

34237 (N—8232071) Flow and thermal effects in continuous flow electrophoresis. Saville, D.A.; Rhodes, P.H. (National Aeronautics and Space Administration, Huntsville, AL (USA). George C. Marshall Space Flight Center). 1979. 10p. NTIS, PC A12/MF A01.

In continuous flow electrophoresis the axial flow structure changes from a fully developed rectilinear form to one characterized by meandering as power levels are increased. The origin of this meandering is postulated to lie in a hydrodynamic instability driven by axial (and possibly lateral) temperature gradients. Experiments done at MSFC show agreement with the theory.

34238 Numerical computation of buoyancy-induced recirculation in curved square duct laminar flow. Chilukuri, R.; Humphrey, J.A.C. (Univ. of California, Berkeley). *International Journal of Heat and Mass Transfer;* **24**: 305-314(1981).

The influence of buoyant effects on developing heat transfer in strongly curved duct flows has been studied numerically for the special case of steady state, incompressible laminar flow of a constant physical property fluid to which the Boussinesq approximation applies. The two cases of: (a) buoyant forces aligned with, and (b) opposed to the main flow direction were investigated. The presence of several streamwise recirculation zones necessitates the solution of fully elliptic transport equations. It is found that when buoyant forces are aligned with the main flow direction in curved duct flow geometries they can significantly enhance the rate of heat transfer, especially at the inner-radius wall. By contradistinction, when buoyant forces and the main flow are opposed, three additional elongated recirculation zones which appear at the inner-radius wall are the cause for reduced heat transfer to the flow in a curved duct.

34239 Dynamics of bubbles and entrained particles in the rotating fluidized bed. Chevray, R.; Chan, Y.N.I.; Hill, F.B. (Brookhaven National Lab., Upton, NY). *AIChE (American Institute of Chemical Engineers) Journal;* **26**: No. 3, 390-398(May 1980). Contract AC02-76CH00016.

Trajectories of bubbles and entrained particles in the rotating fluidized bed were obtained from equations expressing a balance among inertial, centrifugal, Coriolis, gravity and drag forces. The solutions led to information on the behavior of isolated bubbles, bubble swarms and the elutriation characteristics of the rotating fluidized bed.

34240 Laminar-turbulent transition for flow in pipes, concentric annuli, and parallel plates. Hanks, R.W. (Union Carbide Nuclear Co., Oak Ridge, TN). *AIChE (American Institute of Chemical Engineers) Journal;* **9**: No. 1, 45-48(Jan 1963).

Recently Ryan and Johnson proposed a stability parameter for pipe flow. For Newtonian fluids they showed that this parameter Z is proportional to the critical Reynolds number (D anti nu rho/μ) and is given by the relation Z = 2 $\sqrt{1/27}$ N/sub Rec/. They also demonstrated the utility of Z as a stability parameter for the isothermal pipe flow of power-law non-Newtonian fluids. In the present paper a generalized stability parameter will be proposed which is independent of the geometry of the flow system, is proportional to the Reynolds number for Newtonian flow, and contains Ryan and Johnson's results for pipe flows in general as a special case.

4205 Materials Testing

REFER ALSO TO CITATION(S) 33369, 33731, 33973

4208 Electronic Circuits And Devices

34241 (BDX—613-2872) Component reliability as experienced by manufacturer of electronic assemblies. Clements, D.W. (Bendix Corp., Kansas City, MO (USA)). Feb 1983. Contract AC04-76DP00613. 8p. (CONF-830517—5). NTIS, PC A02/MF A01. Order Number DE83011552.

From 33. electronic components conference; Orlando, FL, USA (16 May 1983).

This paper reviews the component definition, procurement, and inspection procedures used by a manufacturer of very high reliability electronic products. The performance of the components during the product manufacturing the inspection process is examined to determine the resultant component failure rate and failure modes. The failure rate for each component type and the most common failure mode for each component type are identified. This information then is reviewed to determine if there are any basic deficiencies for any component type and, if so, what recommendations or changes can be made to improve component reliability.

34242 (BMFT-FB-T—82-119) Application and further development of ion implantation for very large scale integration. Pt. 1. Ryssel, H.; Goetzlich, J.; Haberger, K.; Prinke, G.; Hoffmann, K. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 152p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750071.

The manufacture of highly-complex integrated circuits requires increased precision and better process stability, which means that more subtle processes have to be developed and conventional techniques have to be optimized. In this research project, detailed investigations were made regarding the suitability of ion implantation for the purpose of silicon doping from the viewpoint of the smallest possible structure size, and also regarding new, mostly non-doping implantation applications. The most important results of this research project were the improvement or development of one-dimensional as well as two-dimensional process-simulation programs, the development of a new technique for local oxidation using nitrogen implantation, and the etching of tapered oxide windows using ion-implantation-produced radiation damage. By means of high-energy implantation, it was possible to produce buried isolating and conducting layers having good electrical properties. Other aspects of this study were concerning with the influencing of the oxidation rate by means of implantation, and with radiation-enhanced diffusion.

34243 (BMFT-FB-T—82-120) Application and further development of ion implantation for very large scale integration. Pt. 2. Haberger, K.; Ryssel, H.; Hoffmann, K. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 35p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750070.

Pt. 1 published in BMFT-FB-T--82-119.

Ion implantation, used as a dopant technology, provides very well-controlled doping but is dependent on the usual masking techniques. For purposes of pattern generation, it would be desirable to utilize the digital controllability of a finely-focused ion beam. In this report, the suitability of a finely-focused ion beam for the purpose of direct writing implantation has been investigated. For this study, an ion accelerator was equipped with a computer-controlled fine-focusing system. Using this system it was possible to implant Van-der-Pauw test structures, resistors, and bipolar transistors, which were then electrically measured. The smallest line width was approx. 1 μm. A disadvantage is represented by the long implantation times resulting with present ion sources. Another VLSI-relevant area of application for this finely-focused ion-beam-writing system is photoresist exposure, as an alternative to electron-beam lithography, making possible the realization of very small structures without proximity effects and with a significantly higher resist sensitivity.

34244 (BMFT-FB-T—82-153) Development and application of process and device-simulation for 2μm MOS technology. Wieder, A.; Mader, L.; Tielert, R.; Werner, C. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 85p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750091.

The realization of VLSI chips requires extensive development of fine line technology, as well as special investigations of physical and electrical effects, which become relevant for these structures, and finally the provision and application of CAD tools in the process and device area. Within this project a basis has been realized for process and device simulation which enables effective support of our 2 μm-MOS-technology. This has to be extended to keep up with further development of integrated circuits. The redistribution of impurities during the processing can be calculated by SUPREM, which has been adapted to our technology. A new program takes care of the consideration of 2-D effects. Optical projection printing is supported by the program SAMPLE which has been adjusted to our technological apparatus and processing. An additional program was developed to consider substrate reflectivity effects. The modeling of the electrical performance of devices is enabled by a model hierarchy, ranging from effective design models to complex 2-D device simulators as DESI, PLOT-DESI and MINIMOS. Experimental investigations were focussed on physical effects which become dominant at fine line structures. The results have been used to update process and device simulation programs.

34245 (BMFT-FB-T—82-155) Development of a silicon gate CMOS technology with small structures. Milosevic, I.; Tilenschi, L.; Luft, R.; Cornwell, D. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750085.

Described here is the development of HCMOS technology with structures in the region of 3 μm to 4 μm. Principal objective was to improve both packing density and performance for VLSI CMOS ICs operating at 1.5 V. The main areas of work have been in: design rule definition, photolithography/contact and projection, layout techniques, new process development (high value polysilicon resistors), improvement of existing technology, characterization of process and components, reliability study. Technology developed within the project was successfully demonstrated on an advanced 4 MHz (1.5 V) watch circuit.

34246 (N—8231661) Radiation effects studies for the high-resolution spectrograph. Smith, L.C.; Becher, J. (Old Dominion Univ., Norfolk, VA (USA)). Aug 1982. 110p. (NASA-CR—169273). NTIS, PC A06/MF A01.

The generation and collection of charge carriers created during the passage of energetic protons through a silicon photodiode array are modeled. Pulse height distributions of noise charge collected during exposure of a digicon type diode array to 21 and 75 MeV protons were obtained. The magnitude of charge collected by a diode from each proton event is determined not only by diffusion, but by statistical considerations involving the ionization process itself. Utilizing analytical solutions to the diffusion equation for transport of minority carriers, together with the Vavilov theory of energy loss fluctuations in thin absorbers, simulations of the pulse height spectra which follow the experimental distributions fairly well are presented and an estimate for the minority carrier diffusion length L sub d is provided.

34247 (SAND—82-7156) Annealing studies of amorphous alloys. Wiley, J.D.; Perepezko, J.H.; Nordman, J.E. (Wisconsin Univ., Madison (USA)). Apr 1983. Contract AC04-76DP00789. 37p. NTIS, PC A03/MF A01. Order Number DE83012295.

Amorphous films of the alloys Ni-Nb, Ni-Mo, Mo-Si, and W-Si were sputter deposited on single-crystal semiconductor substrates. One-hour crystallization temperatures of the films were determined to within +-25°C by annealing and x-ray diffraction measurements. Interdiffusion between Au or Cu overlayers and the amorphous films were studied by annealing combined with Auger Electron Spectroscopy (AES) profiling, and by Rutherford Backscatter (RBS) analysis. Supplementary measurements used to study structural relaxation and crystallization included resistivity as a function of temperature; DTA and DSC; and electron microscopy.

34248 (SAND—83-0378C) Aluminum electromigration lifetime variations with linewidth: the effects of changing stress conditions. Arzigian, J.S. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 3p. (CONF-830457—1). NTIS, PC A02/MF A01. Order Number DE83011280.

From IEEE conference on reliability physics; Phoenix, AZ, USA (5 Apr 1983).

The electromigration behavior of aluminum in films deposited by In-Source evaporation has been examined for films with widths ranging from 2 to 5 μm and lengths ranging from 30 to 80 cm. The linewidth dependence of the lifetime was obtained for films subjected to steady direct-current stressing as well as for films subjected to pulsed-current stressing. The results indicate that the observed linewidth dependence is a function of the nature of the accelerated aging method employed. Those samples subjected to high-frequency, (2MHz), low-duty-cycle pulses showed less linewidth dependence for lifetime than did those subjected to high-duty-cycle and steady direct-current stressing. Measurements utilizing pulse nonlinearity testing show a correlation between the onset of degradation as evidenced by a change in the thermal time constant, and the nature of the applied current-stress tests is proposed which may more accurately predict metallization lifetime under actual use conditions.

34249 (UCID—19749) Review of the physics and response models for burnout of semiconductor devices. Yee, J.H.; Orvis, W.J.; Martin, L.C. (Lawrence Livermore National Lab., CA (USA)). Feb 1983. Contract W-7405-ENG-48. 33p. NTIS, PC A03/MF A01. Order Number DE83011778.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Using a combination of the current literature and our own research, we describe the various physical mechanisms of failure of semiconductor devices due to electrical overstress and electromagnetic pulses. In particular, we describe the causes and effects of second breakdown phenomena in p-n junction devices. We also describe the currently used response models that simulate a semiconductor's response to high voltage transients in a circuit or system.

34250 (UCRL—88555) Performance of an array of vertical dipoles over an inhomogeneous ground system. King, R.J.; Mathur, N.C. (Lawrence Livermore National Lab., CA (USA)). Mar 1983. Contract W-7405-ENG-48. 29p. (CONF-830512—2). NTIS, PC A03/MF A01. Order Number DE83012097.

From IEE/APS symposium; Houston, TX, USA (23 May 1983).

The elevation radiation patterns of a stacked array of vertical electric dipoles (VEDs) over several different azimuthally symmetric inhomogeneous ground systems are studied using an integral formulation. As the ground influences the pattern of each VED differently, there is no known optimum array excitation which can be used to achieve desired beam shaping and steering. Patterns in an array of 21 VEDs spaced 0.1 lambda apart are computed and compared to HF (10 MHz) for three excitation functions: (a) conventional linear spacial phasing, (b) phasing according to the complex conjugate of the field produced by each VED in the direction of steering, and (c) specially sinusoidal excitation with constant phasing. Results are given for grounds consisting of homogeneous earth, a perfectly conducting ground plane, a perfectly conducting disk on homogeneous earth and 2 lambda long radial wire ground systems on well- and poorly-conducting earth. It is found that the radiation pattern cannot be steered below about 9° in elevation for any of the excitation functions or the ground systems used. For low-angle steering conjugate excitation produces a slightly narrower beam with smaller sidelobes. Highly conducting grounds tend to permit steering to slightly higher elevations with narrower beams.

34251 **(UCRL—89100) Developing a gate-array capability at a research and development laboratory.** Balch, J.W.; Current, K.W.; Magnuson, W.G. Jr.; Pocha, M.D. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 7p. (CONF-830548—1). NTIS, PC A02/MF A01. Order Number DE83010585.

From 5. biennial university-government-industry microelectronics symposium; Lubbock, TX, USA (25 May 1983).

This paper describes our experiences in developing a gate-array capability for low-volume applications in a research and development (R & D) laboratory. By purchasing unfinished wafers and doing the customization steps in-house, we have been able to shorten turnaround time to as little as one week and to reduce the direct costs to as low as $5K per design. At our Laboratory, we have several hundred design engineers supporting a variety of research programs. Designs generally require fast turnaround (a few weeks to a few months) and very low volumes (1 to 25). Design costs must be kept at a minimum. After reviewing available commercial gate-array design and fabrication services, we have determined our objectives would best be met by using our existing internal integrated-circuit fabrication facilities, our present COMPUTERVISION interactive graphics layout system, and our extensive computational capabilities. We discuss the reasons and the approach we have taken at LLNL in; selecting a particular gate-array wafer, adapting a particular logic simulation program, and how we have enhanced layout aids. We will also describe how we are doing testing of the customized chips. An important part of our project is how we are introducing the technology to internal designers through the development of a course. The content, schedule, and results of our internal gate-array course recently completed are discussed. Finally, our current problem areas and our near-term plans are presented.

34252 **Electronics engineer's design station.** Shectman, R.M.; Bering, D.E. *IEEE Computer Graphics and Applications;* 15-23(Apr 1981). Contract W-7405-ENG-48.

A prototype minicomputer interactive graphics system for the capture, formatting, and dissemination of electronics design information is now in operation at Lawrence Livermore National Laboratory. The system was developed by the laboratory's Computer Systems Research Group to unify the design automation activities at LLNL, while incorporating human factors and modern tools into the electronics design process. Called the Electronics Engineer's Design Station, the system expedites the low-volume, fast-turnaround electronics designs typical of LLNL's research projects. However, many of the concepts of this system address problems common throughout the electronics industry.

4209 Waste Processing Plants And Equipment

34253 **(BDX—613-2938) Biodegradation of chemical plant wastewater containing dimethylformamide.** Carter, J.; Young, D.A. (Black and Veatch Consulting Engineers, Kansas City, MO (USA); Bendix Corp., Kansas City, MO (USA)). Apr 1983. Contract AC04-76DP00613. 17p. (CONF-830546—1). NTIS, PC A02/MF A01. Order Number DE83011123.

From 38. annual Purdue industrial waste conference; West Lafayette, IN, USA (10 May 1983).

A chemical plant being planned for construction will generate a wastewater containing dimethylformamide (DMF) and acetic acid. The DMF must be removed from this wastewater because studies have shown the material to be both embryotoxic and hepatoxic. A design was prepared for an aerobic digestor that will remove these two chemicals using the activated sludge process. A small-scale, pilot plant is being operated on the aerobic digestion process. The pilot unit was run to determine the effluent DMF concentration at design loading under several operating conditions. Effluent concentrations below 10 ppM of DMF were achieved for extended time periods. Details of the plant design and results of the pilot plant data are discussed.

34254 (CONF-820418—, pp 357-364) **Environmental impacts of proposed toxic substances incinerator.** Long, L.W. (Oak Ridge Gaseous Diffusion Plant, TN); Cooper, R.E. Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

A high-temperature incinerator has been proposed for construction at the Oak Ridge Gaseous Diffusion Plant (ORGDP) for the purpose of thermally destroying hazardous organic waste, including polychlorinated biphenyls, contaminated with radioactivity. The facility would handle waste from the Paducah Gaseous Diffusion Plant, the Portsmouth Gaseous Diffusion Plant, the Oak Ridge National Laboratory, and the Oak Ridge Y-12 Plant, as well as the ORGDP. In order to meet the requirements of the National Environmental Policy Act, an Environmental Impact Statement (EIS) has been prepared. The statement provides detailed evaluations of both construction and operating impacts of the proposed incinerator. In general, the environmental impacts associated with the proposed incinerator were determined to be insignificant relative to the benefits it will afford. This paper briefly summarizes the evaluations and conclusions presented in the EIS.

4210 Combustion Systems

REFER ALSO TO CITATION(S) 33086, 33089, 34233, 34234

34255 **(N—8231641) Exhaust gas measurements in a propane fueled swirl stabilized combustor.** Aanad, M.S. (Cornell Univ., Ithaca, NY (USA)). Aug 1982. 177p. (NASA-CR—169293). NTIS, PC A09/MF A01.

Exhaust gas temperature, velocity, and composition are measured and combustor efficiencies are calculated in a lean premixed swirl stabilized laboratory combustor. The radial profiles of the data between the co- and the counter swirl cases show significant differences. Co-swirl cases show evidence of poor turbulent mixing across the combustor in comparison to the counter-swirl cases. NO sub x levels are low in the combustor but substantial amounts of CO are present. Combustion efficiencies are low and surprisingly constant with varying outer swirl in contradiction to previous results under a slightly different inner swirl condition. This difference in the efficiency trends is expected to be a result of the high sensitivity of the combustor to changes in the inner swirl. Combustor operation is found to be the same for propane and methane fuels. A mechanism is proposed to explain the combustor operation and a few important characteristics determining combustor efficiency are identified.

34256 **(ORNL/TM—8618) Carbon utilization in fluidized-bed combustion systems.** Krishnan, R.P.; Zimmerman, G.P.; Lackey, M.E.; Daw, C.S. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 181p. NTIS, PC E08/MF A01. Order Number DE83012138.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Includes 2 sheets of 48x reduction microfiche.

The objectives of the work reported were to systematically evaluate the available data in the literature on carbon utilization and/or combustion efficiency in fluidized combustion systems, and to generate additional data where needed in a bench scale combustor. Trends in carbon utilization as a function of design and operating parameters are presented. Factors affecting the carbon utilization are identified and discussed. (LEW)

34257 **Corrosion of carbon steel in substoichiometric combustion gases.** Daniel, P.L.; Gottschling, J.D.; Miller, A.S. (Babcock and Wilcox Co., Alliance, OH). pp 137-154 of Corrosion-erosion-wear of materials in emerging fossil-energy systems. Levy, A.V. (ed.). Houston, TX; National Association of Corrosion Engineers (1982). (CONF-820144—).

From National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems; Berkeley, CA, USA (27 Jan 1982).

Substoichiometric combustion may be used in the first stage of a staged-combustion coal-fired boiler to reduce NO/sub x/ emissions. This paper discusses corrosion of steel at 482C in substoichiometric combustion gases that contain a small amount of H_2S. The corrosion processes and corrosion kinetics are similar to those for steel at the same temperature in H_2S/H_2 mixtures of similar sulfur

activity. Scale formation appears to involve both solid-state diffusion and gas permeation. FeS forms within the scale as well as at the gas/scale interface, and Fe_3O_4 forms near the scale/metal interface. 11 figures.

4220 Underground Engineering

REFER ALSO TO CITATION(S) 33896

34258 **(BMFT-FB-T—82-162) Fundamental examinations for the mechanisation of the support work in headings by blasting and by using selective cut heading machines.** Stoecker, H.M.; Luerig, H.J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 99p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750113.

Starting from the results of a stock-taking of the support methods used up to now and from exact analyses of the situation in the heading field, a concept will be elaborated with the aim, in addition to the reduction of the well-known high physical strain by the setting of the support, of rationalization of this partial procedure in case of conventional heading. The principal item is a floor-connected transportation and erection-vehicle with electro-hydraulic drive and an adjustable erection deck, which permits a fully mechanised setting of the support inclusive the side sections. By a transversible novel drilling equipment hung up at the roof of a drift a parallelization of different procedures and therewith a rationalization effect can be reached at the same time. The concept of this realizability will be demonstrated at a volume - right and power - right heading model on a scale 1:5. The developed equipment consist of operationally approved single aggregates and for the test they can also be used separately. Therewith a gradual introduction of the system is possible. At the beginning a provisional safety equipment for the direct at the face area will be introduced for the selective cut heading machine driving. According to the actual stage of the first considerations the main disadvantage of the safety equipment is the insufficient stock safety and its outrigger at the support already set.

4230 Marine Engineering

REFER ALSO TO CITATION(S) 34679

34259 (CONF-810622—Vol.2, pp 617-624) **Study of ocean cableships applied to submarine power cable installation.** Soden, J.E. (Simplex Wire & Cable Co., Portsmouth, NH); Libby, D.O.; Spiller, J.R. Jun 1981. NTIS, PC A24. (DOE/CONF—810622-Exc.-Vol.2).

From 8. ocean energy conference; Washington, DC, USA (7 Jun 1981).

Existing ocean cableships are reviewed against a background of increasing need for capability to install heavy power cables in deep water. Applications to 7000 feet are considered. Current practice is examined through a review of major underwater power cable installations around the world. Vessels engaged in cable laying are examined and their adaptability to deep water power cable installation discussed. Significant potential exists in this regard. Advantages and disadvantages of all purpose power and communication cableships are discussed and options for incorporating a dual function in future vessels considered. The approach is in large part through changes in power cable design which would more easily enable both power and communications cable laying functions to be incorporated in future cableships.

34260 **(GKSS—82/E/10) Finite element analysis for evaluation of eigenfrequency and natural shape alterations by welded joint cracks for pipes of offshore-platforms.** Dietrich, R. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)). 1982. 34p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750055.

In this report an analysis is presented for the alteration of frequencies and natural shapes of vibration for a pipe of an offshore structure by different welding cracker fissures. The analysis is performed using the finite element method. The basic concepts of this method are explained. The eight lowest frequencies are stated for different welding cracker fissures. For these frequencies the natural shapes of vibration are demonstrated in three-dimensional form.

4240 Pollution Control Equipment

REFER ALSO TO CITATION(S) 33022, 33024, 33025, 33026, 33027, 33028, 33029, 33030, 33031, 33032, 33033, 33034, 33035, 33036, 33037, 33038, 33039, 33040, 33041, 33042, 33044, 33045, 33046, 33047, 33048, 33049, 33050, 33051, 33052, 33053, 33054, 33055, 33061, 33960, 34398, 34449

34261 (CONF-820418—, pp 292) **Field testing of PCB sorbent materials for use in outside capacitor areas.** Kuehn, R.G. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

During fiscal year 1982, the PGDP initiated a project to place approximately 6000 sq. ft. of PCB sorbent material under 14 outside PCB-containing capacitor banks. The object of this project is to provide for PCB containment and prevent contamination of underlying ground during infrequent failures of outside capacitors at the PGDP. Earlier laboratory studies identified promising PCB sorbents from commercially available sorbent materials. As a long term field test, a prototype containment system was set up under an outside capacitor bank following laboratory recommendations for sorbent materials and their placement. In addition, weathering exposure studies were set up separately to monitor the long-term durability and sorptive capacity of the sorbent materials. An evaluation of data produced from these tests indicated a need for broadening the original vendor survey to include manufacturers of open cell foam weather resistant products. A second containment system has been prepared and includes the most promising of the foam products. Also, weathering exposures have begun to evaluate the long-term durability and sorptive capacity of the selected materials. Results from these studies and vendor survey will be presented.

4250 Power Cycles

34262 **(ANL—82-59) Stirling-engine thermodynamic analysis: a users guide to SEAM1.** Heames, T.J.; Uherka, D.J.; Zabel, J.C.; Daley, J.G. (Argonne National Lab., IL (USA)). Sep 1982. Contract W-31-109-ENG-38. 158p. NTIS, PC A08/MF A01. Order Number DE83011919.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report provides background and procedural information for the use of a general-purpose Stirling-engine analysis code developed at Argonne National Laboratory and available through the National Energy Software Center. Different engine configurations are easily specified, or the user may make use of provided data for existing engines, both kinematic and free piston. The code models heat transfer and fluid mechanics throughout the engine and accounts for system energy flows and losses. Good agreement is shown between code predictions and experimental measurements. The present analysis method was chosen for fast execution and useful information on energy flows in the system. A description is provided of the code structure that is intended to accept different analysis modules that can provide improved system modeling or optimization capability.

43 PARTICLE ACCELERATORS

4301 Design, Development, And Operation

REFER ALSO TO CITATION(S) 33258

34263 **(BNL—32658) Monochromatic radio frequency accelerator cavity.** Giordano, S. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 4p. (CONF-830311—122). NTIS, PC A02/MF A01. Order Number DE83011653.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

In circular accelerators and storage rings it is important that any device placed in the beam line be relatively free of spurious resonances. Accelerating RF cavities inherently have an infinite number of spurious modes. The cavity to be described in this paper makes use of certain geometric construction configurations that eliminate all the spurious modes. A cavity was constructed with an accelerating TMolo mode of 90 MHz. Measurements showed that the TMolo mode was essentially unchanged from a conventional cavity but all modes up to 3 GHz were either completely eliminated or reduced by at least 30 db.

34264 (CONF-830311—128) **Superconducting accelerating structure for particle velocities from 0.12 to 0.23 c.** Shepard, K.W.; Zinkann, G.P. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01. Order Number DE83011712.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

A split-ring resonator has been designed for an optimum particle velocity $\beta = v/c = 0.16$ and a frequency of 145.5 MHz. The ratio of peak-surface electric field to effective accelerating field in the resonator has been reduced 20% from the value obtained in previously developed split-ring resonators. The improved design results from the use of elliptically-sectioned loading arms and drift tubes, which have been enlarged to reduce peak-surface fields and also shaped to eliminate beam-steering effects in the resonator. All fabrication problems presented by the more-complex geometry have been solved, and a prototype superconducting niobium resonator has been completed. An accelerating field of 3.3 MV/m at 4 watts rf input has been so far achieved, corresponding to an effective accelerating potential of 1.17 MV per resonator.

34265 (CONF-8010206—Vol.2, pp vp) **"Electron-5" high-voltage electron accelerator.** Akulov, V.V.; Al'bertinskij, B.I.; Gerasimov, E.I.; Evseev, A.K.; Ivanov, A.S.; Nikiforov, Eh.K.; Svin'in, M.P.; Fedotov, M.T. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The design of the 1.5 MeV "Electron-5" high-voltage electron accelerator of 200 kW power having 1500x60 mm dimensions of the scanned beam and sharp-directed beam of 2 mm diameter is presented. The inductive cascade voltage multiplier with locked magnetic circuit executed by the three-phase circuit is chosen as a source of accelerating voltage. Application of the accelerating tube placed coaxially with the voltage source is presupposed. The electron source with the lanthanum hexaboride cathode provides the irradiator operation during several thousand hours without change of the source. Reliability of the accelerator characterized by mean-cycles-between-failures and operation factor coefficient is evaluated as 500 h and 0.9 respectively.

34266 (CONF-8010206—Vol.2, pp vp) **Application of accelerators for solution of the national economy problems.** Flerov, G.N. 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

Examples of using heavy ion eccelerators, microtrons and electrostatic accelerators in national economy are presented. It is shown that the heavy ion accelerators are successfully used for production of artificial radiation damage of structural materials during several hours of irradiation. Obtaining of microporous nuclear filtres and introduction of atoms of any elements into the surface layers of the materials by means of accelerators is another direction of practical application of heavy ion accelerators. It is shown that microtron is a simple and universal accelerator permitting to solve a wide range of problems of both gamma- and neutron-activation analysis and providing high sensitivity of the analysis. The electrostatic accelerators can be conveniently used for the purposes of element analysis by excitation of characteristic X-ray radiation of the investigated samples by accelerated ions.

34267 (CONF-8010206—Vol.2, pp vp) **Design parameters of a multipurpose cyclotron.** Malyshev, I.F.; Vorogushin, M.F.; Stepanov, A.V. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

Design parameters of two modifications of the MMTs cyclotron with the final radius of acceleration of 110 cm and 250 cm diameter of the electromagnet pole intended for the solution of applied problems are presented. In modification of accelerating light ions the cyclotron is intended for acceleration of protons, deuterons, ions of helium-3 and helium-4. The designed energy of the accelerator makes up 120 Z^2/A MeV and the maximum energy of protons is limited by 70 MeV. The maximum average induction in the air gap makes up 1.4 T. Location of dees with 42 deg angular extension in "valleys" of magnetic structure is the main design peculiarity in modification of the cyclotron for accelerating heavy ions ($4 <= A/Z <= 12$) with an average magnetic field up to (1.9-2.0 T). The output energy of ions within wide ranges can be controlled by changing the location of foil along the radius. Development of two modifications of the cyclotron solves the problem of supply of scientific institutions with a multi-purpose accelerator. Transfer from one modification of the cyclotron to the other becomes possible by substitution of disks with sectors, dees with rods and units of concentric coils.

34268 (CONF-8010206—Vol.2, pp vp) **Present status of the isochronous cyclotron of Czechoslovak Academy of Sciences.** Bejshovets, V.; Chigak, M.; Krzhivanek, M.; Trejbal, Z. (Ceskoslovenska Akademie Ved, Rez. Ustav Jaderne Fyziky). 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The results of adjustment and operation of the U-120 M isochronous cyclotron of the Institute for Nuclear Physics of the Czechoslovak Academy of Sciences are presented. The designed and experimental parameters of ejected beams of protons, deuterons, chemical bond particles and He_3^{++} ions are given. The analysis of the data has shown that the ejection efficiency is 50%. The dependences of the flight phase of proton and deuteron beams on the radius and the dependences of the optimum position of the first deflector section on the proton energy are given. The measurement results of horizontal and vertical emittances of a proton beam at 30 MeV energy after the first quadrupole triplet of the transport channel are shown. Investigations on irradiation of physical, medical and biological targets are in progress.

34269 (CONF-8010206—Vol.2, pp vp) **Present status of construction of the JINR high current phasotron ("F" facility).** Dzhelepov, V.P.; Dmitrievskij, V.P.; Onishchenko, L.M. 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The present status of reconstruction of the JINR phasotron is described aiming at construction of a phasotron with a spatial variation of magnetic field and increasing the intensity of proton, neutron and meson beams. At present new pole disks and new windings with water cooling are mounted. Manufacture of a resonance line and a dee is coming to an end, an accelerating chamber is assembled and complex tests on a frequency variator are carried out. The results of formation of the phasotron magnetic field and the main results of development of separate accelerator systems are presented. A model with an iron- current section is accepted as an ejection channel. The resonance phasotron system is a plane homogeneous half-wave line of the 6 m width and 7.5 m length with a constant vertical gap of 78.5 mm. A closed ion source of the cyclotron type is designed as an ion source.

34270 (LBL—15119) Long-pulse induction acceleration of heavy ions. Faltens, A.; Firth, M.; Keefe, D.; Rosenblum, S.S. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 7p. (CONF-830311—138). NTIS, PC A02/MF A01. Order Number DE83011679.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

A long-pulse induction acceleration unit has been installed in the high-current Cs^+ beam line at LBL and has accelerated heavy ions. A maximum energy gain of 250 keV for 1.5 μs is possible. The unit comprises 12 independent modules which may be used to synthesize a variety of waveforms by varying the triggering times of the low-voltage trigger generators.

34271 (LBL—15142) Mechanical design of a heavy-ion RFQ. Abbott, S.; MacGill, R.; Yourd, R. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—139). NTIS, PC A02/MF A01. Order Number DE83011677.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

The mechanical design and construction of a 199.3 MHz heavy ion RFQ for charge states q/A as low as 0.14 is described. The vane supports and positioning adjustments are significant features of this design. They provide the capability of achieving the precision vane alignment required. The maximum difference between calculated and measured apertures between the vanes is 0.0035 inches, and the average difference is 0.0010 inches. Various important aspects of the design and construction including material selection and plating, RF joints, thermal loading and vacuum system are described. Assembly techniques, methods of mechanical measurement, alignment and structure stability are discussed in detail.

34272 Up-grading of Strasbourg MP-10: results of the first step (13 to 16 MV). Letournel, M.; Oberlin, J.C.; Heng, G. (Centre de Recherches Nucleaires de Strasbourg, France). pp 9-11 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The project consisted essentially in replacing the standard 72″ tube sections by new 88″ tube sections taking advantage both of the protrusion of the electrostatic field towards the dead sections and the room left there. In May 1979, a first new 88″ tube section had been tested separately up to 4.6 MV and in normal MP running conditions for three months. After some difficulties with broken tube glasses, the tests of the total upgraded machine have been carried out op to 16 MV with beam. Since October 1980, the MP runs for the research mainly between 13 MV and 16 MV in perfect conditions. Beam measurements give a transmission of the order of 75% for a proton beam and 60% for an oxygen beam.

34273 Improvements of the Munich MP-tandem. Muenzer, H.; Rohrer, L. (Beschleunigerlaboratorium der Univ. und Technischen Univ. Muenchen, Garching, Germany). pp 50-54 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Operating experience and modifications introduced during the last four years are reported. Usable terminal voltages have increased to 12.8 MV. Some of the main modifications and improvements were: Terminal valves, dead section stripper, modified spark gaps on the column resistors, simple measurement of column and charging currents on high potential, improved generating voltmeter, control of terminal components by microprocessors, improved stripper foils, shorting rod system, new power system and new power supplies for the injector, injector control system with light pipes, improved with logarithmic slit current amplifiers in the beam lines, and a computer monitor and control system.

34274 Development of high gradient, high vacuum accelerator tubes at Daresbury. Joy, T. (Daresbury Lab., Warrington, England). pp 87-97 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The experimental work carried out at Daresbury Laboratory for the development of high gradient, high vacuum accelerator tube is reviewed. The main parameters of the Mk.I tube produced for the Nuclear Structure Facility are described.

34275 Baking procedure of the accelerator tube by means of low voltage arc discharge. Isoya, A.; Nakajima, Y.; Nakashima, T.; Kato, N.; Kobayashi, K.; Sugimitsu, T.; Kimura, K.; Mitarai, S.; Maeda, T.; Miyake, Y. (Kyushu Univ., Fukuoka, Japan). pp 98-102 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Within the last one year a technique for baking a long accelerator tube of the tandem accelerator by means of a gaseous discharge was investigated extensively in this laboratory, and the terminal voltage could be raised to more than 10MV.

34276 Bremsstrahlung characteristics and particle trajectories in inclined field tubes of alternating or spiraling transverse fields. Kiss, A.; Koltay, E.; Szabo, G. (Hungarian Academy of Sciences, Debrecen). pp 103-106 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Calculations and experiments have been carried out in order to compare the ion - optical behavior of acceleration tubes of homogeneous field as well as of inclined fields with alternating or spiraling transversal components. The experiments were performed on the 5 MV single ended Van de Graaff accelerator of the Institute. Here tubes composed of C-9 glass rings, electrode support annuli and replaceble inner electrodes permitted us to use the same tube with different field configurations. Bremsstrahlung spectra were taken at a number of places with longitudinal coordinates varying along the tube axis. Evaluation was made in terms of end point energies of x-rays correlated with maximum energies of secondary electrons. Calculations were performed for ion and electron trajectories in a number of cases corresponding to different tube constructions. A good agreement has been found between calculated electron data and those extracted from measured bremsstrahlung spectra.

34277 Vivitron: new design for an electrostatic accelerator. Second step of the up-grading of the Strasbourg MP-10 (16 MV - 18 MV). Letournel, M. (Centre de Recherches Nucleaires de Strasbourg, France). pp 247-253 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The second step of this up-grading is based: first on the possibility of each section to stand a voltage of at least 4.8 MV except a limitation due to the tube Nr. 1, second on the column structure capable of 20 MV, and third on some modifications of the column itself allowing to decouple a part of the stored energy. The tube Nr. 1 is changed and lengthened up to 96″. New electrodes of V shape are introduced into the gap between the column and the tank. It is expected a running voltage of 18 MV. Keeping the same 20 KV/cm tube gradient, a new design for an electrostatic accelerator is described, based on a new column configuration, allowing to reduce some dimensions, and to consider vertical and horizontal versions.

34278 **High current multi-megavolt ion accelerators.** Goldie, C.H. (High Voltage Engineering Corp., Burlington, MA). pp 254-257 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Multi-megavolt high current ion accelerators are under consideration for fusion energy research. The importance of tube vaccum to efficient operation of such accelerators is discussed. A description is given of a proposed ICT powered 2 MeV, 15 mA deuterium molecular ion accelerator utilizing existing technology.

34279 **Accelerator design for 50 MV.** Herb, R.G. (National Electrostatics Corp., Middleton, WI). pp 258-263 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Fundamental problems of achieving 50 MV terminal potential on an electrostatic accelerator are considered. Four different discharge paths are discussed, including the support structure, the charging system, the accelerating tube, and spark gaps. Radial field control, using intermediate shells is also discussed. (GHT)

34280 **NELMA project. I. Objectives of the methodical aspects.** Madueme, G.C. (Univ. of Ife, Nigeria). *NBS Special Publication (United States);* No. 594, 429-432(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The significance of the NELMA Project is presented. The main aim is to inject new and useful frontiers into the medical care facilities in Nigeria and to provide broader scopes for applying excited nuclear probes to research in bio-agricultural economics as well as in nuclear and solid state physics.

4302 Beam Dynamics, Field Calculations, And Ion Optics

REFER ALSO TO CITATION(S) 34264, 34276, 34316, 34331

34281 **(BNL—32730) Transport in rectangular quadrupole channels.** Meier, E. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 4p. (CONF-830311—115). NTIS, PC A02/MF A01. Order Number DE83011353.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

Multiple electrostatic quadrupole arrays can be produced in many different geometries. However, the fabrication process can be considerably simplified if the poles are rectangular. This is especially true for millimeter sized channels. This paper presents the results of a series of measurements comparing the space charge limits in cylindrical and rectangular quadrupole channels.

34282 **(LA-UR—83-775) Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept.** Owen, R.K.; Fazio, M.V.; Boyd, T.J. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 4p. (CONF-830311—113). NTIS, PC A02/MF A01. Order Number DE83011109.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Stagger tuning of accelerator cavities, or blocks of cavities, can significantly enhance the achievable charge transfer through an electron linac operating in the stored-energy mode. The output bremsstrahlung flux can be increased over a conventional approach by an order of magnitude without any significant degradation in emittance growth or energy spread. Given a suitable injector, a 1500-rad/pulse, 50-MeV radiographic linac appears to be practical at a 400-MHz operating frequency; a 150-rad/pulse, 50-MeV radiographic linac will operate at 1300 MHz. A multidimensional study was made using the PARMELA code where several parameters, including beam current, synchronous phase angle, and beam radius, were varied while observing the effects on emittance and transmission efficiency.

34283 **(LBL—15117) Threshold behavior for longitudinal stability of induction linac bunches.** Bisognano, J.; Haber, I.; Smith, L. (Lawrence Berkeley Lab., CA (USA); Naval Research Lab., Washington, DC (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—117). NTIS, PC A02/MF A01. Order Number DE83011703.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

The induction linac bunches of heavy-ion-fusion scenarios are strongly influenced by the longitudinal space-charge impedance. This is in distinct contrast to relativistic bunches in storage rings where most of the data on stability have been obtained. Simulation results reveal that when space-charge effects are large, the stability requirement of small growth rate relative to the synchrotron frequency for relativistic bunches is replaced by the relaxed condition of small growth rate relative to the frequency spacing of the space charge wave modes on the bunch. Dispersive effects from finite pipe size tend to make the lower frequencies less susceptible to instability than higher frequencies. Since induction modules have a high resistive component only for the lowest bunch modes, stability is better than would occur for a broadband impedance of comparable magnitude. These results indicate that long-term longitudinal bunch stability is realizable for induction-linac drivers for heavy-ion fusion.

34284 **(LBL—15132) Quadrupole beam-transport experiment for heavy ions under extreme space charge conditions.** Chupp, W.; Faltens, A.; Hartwig, E.C. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—136). NTIS, PC A02/MF A01. Order Number DE83011691.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

A Cs ion-beam-transport experiment is in progress to study beam behavior under extreme space-charge conditions. A five-lens section matches the beam into a periodic electrostatic quadrupole FODO channel and its behavior is found to agree with predictions. With the available parameters ($\leqq$ 200 keV, $\leqq$ 20 mA, $\pi\epsilon$/sub n/ $\geqq 10^{-7}\ \pi$ rad-m, up to 41 periods) the transverse (betatron) occillation frequency (nu) can be depressed down to one-tenth of its zero current value (nu/sub 0/), where nu/sup 2/ = nu/sub 0//sup 2/ - ω/sub p/^{2}/2, and ω/sub p/ is the beam plasma frequency. The current can be controlled by adjustment of the gun and the emittance can be controlled independently by means of a set of charged grids.

34285 **(LBL—15137) Electron-beam buncher to operate over the frequency range 1-4 GHz.** Goldberg, D.A.; Arthur, A.A.; Flood, W.S.; Voelker, F. (Los Alamos National Lab., NM (USA)). Mar 1983. Contract AC03-76SF00098. 7p. (CONF-830311—137). NTIS, PC A02/MF A01. Order Number DE83011692.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

We present a description of an electron buncher to be installed in the terminal of a Van de Graaff, which is to produce a modulated beam over the frequency range 1-4 GHz. The modulator geometry has been optimized so that the modulation amplitude should be nearly constant over the frequency ranges 1-2 GHz and 2-4 GHz. Preliminary results indicate the device works as predicted.

34286 **(LBL—15140) Improved field stability in RFQ structures with vane-coupling rings.** Schneider, H.R.; Lancaster, H. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—120). NTIS, PC A02/MF A01. Order Number DE83011686.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

The small apertures common in many RFQ linac designs lead to tuning difficulties, primarily because asymmetries in the

quadrant fields can arise as a result of small non-uniformities in the vane-to-vane capacitances. Sensitivity to such capacitance or other tuning variation in the quadrants is greatly reduced by the introduction of pairs of vane-coupling rings that provide periodic electrical connections between diametrically opposite vanes. Results of measurements on a cold model RFQ structure with and without vane-coupling rings are presented. The number of rings required for field stabilization and the effect of rings on mode frequencies are discussed.

34287 **(LBL—15141) Beam dynamics and vane geometry in the LBL Heavy-Ion RFQ.** Staples, J. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 5p. (CONF-830311—126). NTIS, PC A02/MF A01. Order Number DE83011680.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

The Heavy Ion RFQ accelerator, presently undergoing acceptance tests, extends the application of the RFQ principle to charge-to-mass ratios considerably less than one. In this design the aperture is very small compared to the operating wavelength, causing a large capacitive loading of the structure and also in a high sensitivity of the field configuration of the structure to vane alignment. A structure has been derived that eases the vane alignment procedure and reduces the sensitivity to vane misalignment. The selection of the vane cross section facilitates machining and evantual frequency trimming.

34288 **(LBL—15146) Array of 1- to 2-GHz electrodes for stochastic cooling.** Voelker, F.; Henderson, T.; Johnson, J. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 4p. (CONF-830311—135). NTIS, PC A02/MF A01. Order Number DE83012441.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

Described is an array of directional-coupler loop pairs that are to be used as either pickup or kicker electrodes for the frequency range of 1 to 2 GHz. Each coupler pair is a $\lambda/4$ long parallel-plane transmission line that is arranged to be flush with the upper and lower surfaces of a rectangular beam pipe. As pickups, the coupler pairs are used in arrays and are operated at 80 degrees Kelvin for improving the signal-to-noise ratio. The loop output power is added in stripline combiner networks before being fed to a low-noise preamplifier. When the couplers are used as kickers, the combining network serves to split power and distribute it uniformly to each electrode.

34289 **(LBL—15158) Conceptual magnet design for an iron-free colliding beam accelerator.** Taylor, C.; Meuser, R.B. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 7p. (CONF-830311—118). NTIS, PC A02/MF A01. Order Number DE83011685.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Superconducting accelerator magnets usually have magnetic iron yokes to obtain maximum magnetic field and to limit stray field. However, the iron is expensive and heavy. The smaller size and weight of an iron-free magnet can result in lower magnet and refrigeration costs. However in a colliding beam accelerator the stray field from one ring produces aberrations in the field in the other. A way to eliminate this mutual interference is to surround each magnet with a coil that exactly cancels the field from the other ring magnet. That is expensive in terms of superconductor requirements. However, the cancellation of the external dipole field component is unnecessary. Only a small amount of superconductor is required for cancellation of the higher-order field-aberration components. Parameters for the iron-free magnet concept are investigated, and a preliminary conceptual design for an accelerator is presented.

34290 **(LBL—15208) Isochronous stacking-ring approach to the HTE.** Selph, F.; Grunder, H.; Leemann, B. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—119). NTIS, PC A02/MF A01. Order Number DE83011668.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

The problem of finding a suitable apparatus for demonstrating heavy ion fusion is a difficult one to approach in moderate steps. An accelerator which can achieve break-even is probably too expensive as a first step in the present climate of trimmed budgets. A meaningful test of many of the concepts could be achieved with a device capable of heating a disk of material to plasma temperatures in the neighborhood of 100 eV (10^6 degrees K). Such apparatus would be useful for testing beam transport, focusing and targeting concepts, as well as target behavior in the plasma regime. Ideally, the technology used in this high temperature experiment (HTE) could also be extended to construct a prototype fusion facility. Target heating for the HTE requires a short beam burst on the order of tens of nanoseconds with a total beam energy of a kilojoule or more. The rf linac falls far short of this capability. The paper looks at an alternative means, using a linac followed by an isochronous stacking ring (ISR), producing rapidly the high multiplication of beam current required. This method avoids the necessity for beam manipulations such as beam splitting, rf bunching in a storage ring, etc. Because of the fast transit time in the ISR, storage ring instabilities are not a problem.

34291 **(LBL—15234) Stochastic cooling: recent theoretical directions.** Bisognano, J. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—116). NTIS, PC A02/MF A01. Order Number DE83011702.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

A kinetic-equation derivation of the stochastic-cooling Fokker-Planck equation of correlation is introduced to describe both the Schottky spectrum and signal suppression. Generalizations to nonlinear gain and coupling between degrees of freedom are presented. Analysis of bunch beam cooling is included.

34292 **(LBL—15963) Permanent multipole magnets with adjustable strength.** Halbach, K. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—129). NTIS, PC A02/MF A01. Order Number DE83012442.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

Preceded by a short discussion of the motives for using permanent magnets in accelerators, a new type of permanent magnet for use in accelerators is presented. The basic design and most important properties of a quadrupole will be described that uses both steel and permanent magnet material. The field gradient produced by this magnet can be adjusted without changing any other aspect of the field produced by this quadrupole. The generalization of this concept to produce other multipole fields, or combination of multipole fields, will also be presented.

34293 **(UCID—19673) Four-way rf beam separator.** Neil, V.K. (Lawrence Livermore National Lab., CA (USA)). 30 Aug 1982. Contract W-7405-ENG-48. 36p. NTIS, PC A03/MF A01. Order Number DE83011921.

A method for separating a continuous beam of relativistic particles into four pulsed beams is investigated theoretically. The separation is periodic with period $2\pi/\omega$ so that each of the four beams consists of current pulses of duration π/ω. The separation is accomplished by a series of rf cavities in the beam line. The cavities operate in the TM_{110} and have frequencies, ω, 3ω, 5ω, 7ω, etc. The transverse momentum imparted to the beam particles results in a time-dependent displacement of the beam centroid at a position downstream of the cavity array. The mathematical limitations imposed by truncating a Fourier series are discussed, and an expression derived for the necessary phase and amplitude of each cavity. The rf induced by the beam in the cavities is treated in detail, and does not appear to be a serious problem.

34294 **(UCRL—88260) Simple method for damping transverse motion of a high intensity electron beam.** Prono, D.S.; Caporaso, G.J.; Clark, J.C.; Lauer, E.J.; Struve, K.W. (Lawrence Livermore National Lab., CA (USA)). 4 Mar 1983. Contract W-7405-ENG-48. 4p. (CONF-830311—125). NTIS, PC A02/MF A01. Order Number DE83012109.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

We describe a simple electrostatic focusing method which efficiently damps transverse motion of a high-intensity (both high current and high particle energy) electron beam. The principle is to create an electrostatic central force anharmonic potential field which phase-mix damps transverse beam motion into increased beam emittance. The non-linear electrostatic field is created by a very resistive wire (L/R time $\sim$ 2 ns) strung axially down the accelerator vacuum pipe. Positive-image charge equal to $\sim$ 1/2 the negative-beam charge is induced onto the wire. Since the beam self fields cancel to within $1/\gamma^2$, the resultant wire electric field dominates. Experimental results showing the guiding, focusing and damping of transverse motion will be presented.

34295 **Choice of field patterns of the straight field accelerating tube and its optic characteristics.** Lai, W.; Xu, S.; Zhu, X. (Inst. of Nuclear Research, Shanghai, China). pp 110-113 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The choice of field patterns of the straight field accelerating tube is made by tracing trajectories of low energy secondary particles. A diaphragm with conical central hole, which has better suppression capability, is given. The electric field distribution on the tube axis and its transport matrix are also provided.

34296 **Design considerations and present status of beam bunching technology.** Skorka, S.J. (Muenchen Univ., Garching, Germany). pp 130-138 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A simple formalism is presented for the analysis of a tandem beam bunching system consisting of a low-energy and a high-energy buncher. The nonlinearity of the buncher waveform, the nonuniformity of the electric field distribution in the gaps, and the stripper energy spread are considered with the aim of minimizing their inevitable influence on the size of the final longitudinal phase space. The choice of the buncher type and of important parameters like injection energy and frequencies are discussed.

34297 **Different way to consider a pulsed beam.** Letournel, M. (Centre de Recherches Nucleaires de Strasbourg, France). pp 139-142 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

In this paper, the pulsed beam is considered to be accelerated as a solid without deformation all along the accelerator. Hence it follows some considerations and particularities affecting the beam injection parameters, the pulse length, the focus point and the energy modulation.

34298 **Analyzed method for calculating the distribution of electrostatic field.** Lai, W. (Inst. of Nuclear Research, Shanghai, China). pp 149-152 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

An analyzed method for calculating the distribution of electrostatic field under any given axial gradient in tandem accelerators is described. This method possesses satisfactory accuracy compared with the results of numerical calculation.

4303 Auxiliaries And Components

REFER ALSO TO CITATION(S) 34228, 34285, 34353, 34750, 34861

34299 **(BNL—32770) Pulsed power supply system for the fast quadrupoles in the AGS.** Nawrocky, R.J.; Lambiase, R.F. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 4p. (CONF-830311—114). NTIS, PC A02/MF A01. Order Number DE83011360.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

In the acceleration of polarized protons in the AGS, a number of depolarizing resonances will be encountered. Depolarization due to the so-called intrinsic resonances will be minimized by crossing each resonance in less than one beam revolution period ($\sim$ 2 μs). This will be accomplished with a set of twelve fast tune-shifting quadrupoles distributed symmetrically around the ring. During a typical acceleration cycle, the fast quads will be energized with a burst of alternating polarity, fast rise/slow fall triangular current pulses. The amplitude of these pulses will vary from 160 A to about 2700 A peak. This paper describes the development of the pulsed power supply for the fast quads, the construction of a prototype modulator, and some of the initial test results obtained with the prototype.

34300 **(BNL—32843) Fast asynchronous level 1 pre-trigger for electrons at L = 10^{33}cm^{-2}sec^{-1}.** Tannenbaum, M.J. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 3p. (CONF-830224—9). NTIS, PC A02/MF A01. Order Number DE83011361.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Asynchronous Triggers have long been used at fixed target accelerators and the CW High Luminosity CERN ISR. Bunched beam colliders have tended to use triggers which were synchronized with the time of the beam crossing. The CDF trigger scheme has 3.5 μsec between such crossings to decide whether to further process any events which occurred during the crossing. The level 1 trigger can accept a rate of 50 KHz without appreciable dead time. The level 2 trigger uses fast bit-slice processors to select event topologies in 10 μsec and thus can accept a trigger rate of 5 KHz. Readout of the system which takes 1/2 msec is required for level 3, thus limiting the triggering rate at level 3 to $\sim$ 100 Hz. The purpose of this note is to show that this same trigger scheme would work at a CW luminosity of 10^{33}cm^{-2}sec^{-1} by the addition of a conventional hard-wired asynchronous pre-trigger.

34301 **(BNL—32849) Operation of the AFS at L = 1.4 x 10^{32} cm^{-2} sec^{-1}; a first look at data at high luminosity from the CERN ISR.** (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 3p. (CONF-830224—11). NTIS, PC A02/MF A01. Order Number DE83011352.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Portions are illegible in microfiche products.

In December 1982 a run was made at the CERN ISR which utilized the superconducting low beta quadrupoles in intersection I8 at the ISR and achieved a luminosity of 1.4 x 10^{32} cm^{-2} sec^{-1} for 26 x 26 GeV pp collisions. At this luminosity the mean time between inelastic collisions is about 200 ns. A comparison run was also made at the same energy with a luminosity of 3.0 x 10^{30} cm^{-2} sec^{-1}. The luminosity under normal running conditions is typically 1.5 x 10^{31} cm^{-2} sec^{-1}. Data were collected with the Axial Field Spectrometer with a variety of calorimeter triggers. The calorimeter is a uranium-scintillator sandwich type with wavelength shifter readout and covers the polar angle range $50^0 <$ theta $< 130^0$. The shaping amplifiers used in the trigger have an integration time of 60 ns and the ADC gate for the photomultiplier signals has a length of 120 ns. The triggers ranged from a nonselective total transverse energy trigger (E/sub TOT/) to more selective jet and single particle triggers. The jet trigger summed the transverse energy in an azimuthal range Δ phi $\approx 45^0$. We have compared several trigger rates at the two luminosities to see if the observed rates scale with the luminosity.

34302 (BNL—32904) Recent developments at BNL. Ratner, L.G. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 8p. (CONF-830471—1). NTIS, PC A02/MF A01. Order Number DE83011642.

From Saturne study meeting; Maine-et-Loire, France (25 Apr 1983).

Portions are illegible in microfiche products.

Topics of interest to the Saturne program, including the status of the polarized beam project, and the accumulator/booster ring, are discussed. The status of the colliding beam accelerator (CBA) is covered. (GHT)

34303 (BNL—32929) Recent upgrading of the Brookhaven double MP facility and plans for the future. Thieberger, P. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 4p. (CONF-821066—5). NTIS MF A01. Order Number DE83011641.

From Symposium for Northeastern Accelerator personnel; Seattle, WA, USA (6 Oct 1982).

Microfiche only, copy does not permit paper copy reproduction.

The recent improvements of the Brookhaven tandems have resulted in operation at higher terminal voltages for both accelerators. MP6 can now operate at about -11 MV when used as an injector for MP7. The terminal voltage of MP7 can easily reach 16 MV, and 16.5 MV operation has been used for one experiment.

34304 (BONN-HE—82-12) Dynamic deuteron polarization measurements performed in a new type of horizontal dilution cryostat. Meyer, W.; Althoff, K.H.; Kaul, O.; Riechert, H.; Schilling, E. (Bonn Univ. (Germany, F.R.). Physikalisches Inst.). May 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750107.

We have reached 31% deuteron polarization in D- ammonia (ND_3) and 27% in D- butanol ($C_4D_{10}O$). The dynamic polarization experiments were performed at a magnetic field of 2.5 T in a new type of horizontal dilution cryostat. This dilution cryostat, built for target asymmetry measurements with a photon beam, was developed with special regard to fast cool-down and easy loading of the target material. The cooling power is 5 mW at 0.2 K, 20 mW at 0.3 K and 34 mW at 0.4 K. Starting from room temperature the lowest temperature of 165 mK is reached in about 2 h including the loading of the target material.

34305 (CONF-830130—, pp 252-260) **Atomic needs for ion beams.** Jones, K.W. (Brookhaven National Lab., Upton, NY). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Atomic physics ion beam requirements were discussed. Figures are presented which were used in this discussion. Needs were broken out according to element, beam energy, charge state, and beam current. (GHT)

34306 (CONF-830311—130) Dual-frequency ring-magnet power supply with flat bottom. Praeg, W.F. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01. Order Number DE83011724.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

A power supply is described that furnishes an essentially flat-bottom injection field, followed by a dual-frequency cosine field. This results in efficient beam capture during injection and reduces significantly the peak rf power required during acceleration in a rapid-cycling synchrotron.

34307 (CONF-830311—131) Argonne Tandem-Linac Accelerator System. Bollinger, L.M. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 6p. NTIS, PC A02/MF A01. Order Number DE83011718.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

Design considerations and operational experience for the existing heavy-ion accelerator consisting of a tandem injecting into a superconducting linac are summarized, with emphasis on the general features of the system. This introduction provides the basis for a discussion of the objectives and design of ATLAS, a larger tandem-linac system being formed by expanding the existing superconducting linac.

34308 (CONF-830311—132) Dual-aperature dipole with 2nd harmonic. Praeg, W.F. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01. Order Number DE83011708.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

Two-rapid-cycling accelerator rings are arranged in one magnet-iron structure. There are two sets of coils, one located in each ring, which are connected in series and excited with a first-harmonic frequency. One dc bias coil and one second-harmonic coil are common to both rings. The second harmonic reduces B during acceleration by 33% as compared to single-frequency operation. The features of this economical arrangement are described and compared to more-conventional systems. This system is especially suitable for combined-function magnets.

34309 (CONF-8010206—Vol.2, pp vp) **Radiation problems at superconducting high-intensity accelerators of high-energy protons.** Lebedev, V.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The problems of radiation heating and protection of superconducting magnetic systems (SMS) of designed high-energy proton accelerators are considered. It is shown that: 1) the analogy method is the main method of forecasting particle losses; 2) the development of more precise methods for calculation of beam loss localization and the description of the processes of halo formation in accelerators is necessary. The following ways of SMS shielding from radiation are suggested: shielding of magnets and lenses by means of special shielding collimators of the length up to 6 m and aperture less than the aperture of these elements; beams bending in front of the electrostatic septum through the angle of the order of several mrad; increase the wall thickness of the vacuum chamber up to 5-10 mm in the place of the SMS high irradiation. Noted is the necessity of development of an independent metrological base on the accelerators and as the first stage of this work - organization of wide-scale collation of the equipment in the national and international scale.

34310 (CONF-8010206—Vol.2, pp vp) **Development and investigation of small-sized unsoldered accelerating tubes for a neutron laser generator.** Bespalov, D.F.; Bykovskij, Yu.A.; Kozlovskij, K.I.; Kozyrev, Yu.P.; Mints, A.Z.; Pleshakova, R.P.; Ryabov, E.V.; Tsybin, A.S.; Shikanov, A.E. (Moskovskij Inzhenerno-Fizicheskij Inst. (USSR); Vsesoyuznyj Nauchno-Issledovatel'skij Inst. Yadernoj Geofiziki i Geokhimii, Moscow (USSR)). 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The results of development and experimental investigation of unsoldered accelerating tubes of the neutron laser generator intended for application in nuclear geophysics, radiation therapy, activation analysis and in other fields are presented. Coaxial position of the elements is characteristic for the accelerating system. Neutron laser source is presented in the form of zirconium deuteride pellet placed in the anode cavity. The laser system permits to generate single pulses of (20-30)ns duration of 0.15 J amd 1.06 μm wave length. The neutron yield at 120 kV.amplitude of high-voltage pulse and 0.15 G energy made up $2x10^6$ neutron pulse and the accelerated charge (deuterons and single-charge ions of zirconium) approximately 10^{-5} kl. Further improvement of the tubes is connected with transfer from solid-state lasers to the lasers on CO_2 of 10.6 μm wave length of radiation and application of the method of magnetic insulation of the electron component.

34311 (CONF-8010206—Vol.2, pp vp) **Optimization of dimensions of the accelerating resonator of an accelerating-storage complex.** Abramov, A.G.; Dajkovskij, A.G.; Katalev, V.V.; Portugalov, Yu.I.; Sulygin, I.I.; Shembel, B.K. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij:. 1981. (In Russian). Joint Inst. for Nuclear Research, Dubna, USSR. (INIS-SU—133).

From 7. all-union national conference on particle accelerators; Dubna, USSR (14 Oct 1980).

The results of optimization of the accelerating system of the IHEP accelerating-storage facility (ASF) are presented. The accelerating system consists of two cylindrical resonators. The problem of optimization of parameters of a resonator and its central openings is to reduce the number of higher modes of oscillations and impedances of their coupling with a beam at a permissible variation of HF parameters at the fundamental frequency. The values of eigenfrequency, shunting resistance, coupling resistance for different oscillation modes and examples of electric field topology are presented. As a result of analytical calculations for tested samples of the ASRC resonators the following parameters are chosen: the 0.6 m length and 0.3 m internal opening diameter.

34312 **(DOE/ER—0164) Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee.** (Department of Energy, Washington, DC (USA). Office of Energy Research; National Science Foundation, Washington, DC (USA). Div. of Physics). Apr 1983. 79p. NTIS, PC A05/MF A01. Order Number DE83011840.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This Panel finds that the highest priority for new accelerator construction in the US nuclear physics program is for an electron accelerator of high duty factor capable of producing beams at any energy in the range from 500 to 4000 MeV. After detailed study and consideration of the proposals for such facilities submitted to it, the Panel recommends: that the proposal submitted by the Southeastern University Research Association (SURA) be accepted and funded for the construction of a new National Electron Accelerator Laboratory (NEAL) centering on a 4 GeV linear accelerator-stretcher ring system capable of delivering intense, high duty factor, electron beams in the energy range from 500 to 4000 MeV. Additional recommendations relating to this principal one are to be found in the body of this report. As modified by the Panel consequent to its own studies and analyses, the estimated cost (in 1983 dollars) of the accelerator complex is 111.8 million dollars; of the entire laboratory is 146.8 million dollars; and the operating cost averaged over the first five years of operation is 18.1 million dollars per year. The projected 15 year total cost of the project is 418.3 million dollars. The construction period is estimated to be 4.5 years. The NEAL Laboratory, from the outset will be constructed and managed as a national rather than a regional facility and will provide the United States with a truly unique facility for research in electromagnetic physics.

34313 (LBL—14986, pp 41-43) **Physical characterization of energetic heavy-ion beams.** Schimmerling, W.; Subramanian, T.S.; McDonald, W.J.; Kaplan, S.N.; Sadoff, A.; Gabor, G. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

When beams of heavy ions are used in radiation therapy and biology, the character of the beam is altered as the particles travel through tissue. The velocity of the particles is affected by electromagnetic interactions that slow and spread the beam. Fragments are produced by nuclear interactions and these are also affected by passage through subsequent material. The biological effects produced by the beam depend on the fragments present as well as their fluence, charge, and velocity. The multidetector particle identification spectrometer is used to identify each particle in the radiation field and to measure its velocity. With this spectrometer we have begun to study reaction cross sections, angular distributions of emitted particles, fluence spectra as a function of absorber thickness, the energy loss of relativistic heavy ions in matter, and the dependence of W, the average energy required to produce an ion-pair in an ionization chamber, on the charge and energy of the particles.

34314 **(LBL—15088) LBL Magnetic-Measurements Data-Acquisition System.** Green, M.I.; Nelson, D.H. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—124). NTIS, PC A02/MF A01. Order Number DE83011682.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

The LBL Magnetic Measurements Engineering (MME) Group has developed a Real-Time Data Acquisition System (DAS) for magnetic measurements. The design objective was for a system that was versatile, portable, modular, expandable, quickly and easily reconfigurable both in hardware and software, and inexpensive. All objectives except the last were attained. An LSI 11/23 microcomputer is interfaced to a clock-calendar, printer, CRT control terminal, plotter with hard copy, floppy and hard disks, GPIB, and CAMAC buses. Off-the-shelf hardware and software have been used where possible. Operational capabilities include: (1) measurement of high permeability materials; (2) harmonic error analysis of (a) superconducting dipoles and (b) rare earth cobalt (REC) and conventional quadrupole magnets; and (3) 0.1% accuracy x-y mapping with Hall probes. Results are typically presented in both tabular and graphical form during measurements. Only minutes are required to switch from one measurement capability to another. Brief descriptions of the DAS capabilities, some of the special instrumentation developed to implement these capabilities, and planned developments are given below.

34315 **(LBL—15108) Magnet coil system for a superconducting spectrometer (HISS).** Reimers, R.M.; Wolgast, R.C.; Yamamoto, R.M. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 5p. (CONF-830311—133). NTIS, PC A02/MF A01. Order Number DE83011676.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

The Heavy Ion Superconducting Spectrometer (HISS) facility and coils are briefly described while most of the paper discusses the support structures consisting of flanged doubly tapered stainless steel cylinders having a Z-shaped cross-section with average diameter of approximately 2.35 meters and height of $\sim$ .49 meters. This member serves as a one piece coil support to resist gravitational, seismic, and magnetic forces with an approximate heat leak to helium of 59 watts per cylinder during operation of magnet at 4 degrees K. Maximum magnetic forces on each coil are over 11 meganewtons at 3T excitation. Magnetic forces attracting the coils to the core vary with excitation in direction as well as in magnitude. Radial magnetic forces produce stresses internal to the coil bobbin.

34316 **(LBL—15136) Slotted coax as a beam electrode.** Lambertson, G.R.; Kim, K.J.; Voelker, F.V. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 7p. (CONF-830311—127). NTIS, PC A02/MF A01. Order Number DE83011678.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

The slot coupled TEM line has been employed at CERN as a pick up electrode in the GHz range. It is a compact and broad band device, and will be quite attractive if the coupling efficiency is competitive with an array of quarter wave loops. In this paper, we study various properties of such a structure.

34317 **(LBL—15147) Design of a dedicated heavy ion accelerator for radiotherapy.** Gough, R.; Alonso, J.; Elioff, T. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 5p. (CONF-830311—123). NTIS, PC A02/MF A01. Order Number DE83011675.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

A new heavy-ion accelerator facility for radiotherapy is being designed at the Lawrence Berkeley Laboratory. Performance requirements have been established. Ions from helium to argon can be accelerated to a maximum energy of 800 MeV/nucleon with intensities in the range 10^8 to 10^9 particles per second. The accelerator subsystems consist of a linac injector, a synchrotron, and a beam-delivery system. Specifications have been developed for many

of the technical components, and some details of the technical design are presented.

34318 (LBL—15148) High-performance control system for a heavy-ion medical accelerator. Lancaster, H.D.; Magyary, S.B.; Sah, R.C. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 5p. (CONF-830311—140). NTIS, PC A02/MF A01. Order Number DE83011687.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

A high performance control system is being designed as part of a heavy ion medical accelerator. The accelerator will be a synchrotron dedicated to clinical and other biomedical uses of heavy ions, and it will deliver fully stripped ions at energies up to 800 MeV/nucleon. A key element in the design of an accelerator which will operate in a hospital environment is to provide a high performance control system. This control system will provide accelerator modeling to facilitate changes in operating mode, provide automatic beam tuning to simplify accelerator operations, and provide diagnostics to enhance reliability. The control system being designed utilizes many microcomputers operating in parallel to collect and transmit data; complex numerical computations are performed by a powerful minicomputer. In order to provide the maximum operational flexibility, the Medical Accelerator control system will be capable of dealing with pulse-to-pulse changes in beam energy and ion species.

34319 (LBL—15157) 9.1-T iron-free Nb-Ti dipole magnet with pancake windings. Gilbert, W.; Caspi, S.; Hassenzahl, W.; Meuser, R.; Peters, C.; Rechen, J.; Schafer, R.; Taylor, C.; Wolgast, R. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—134). NTIS, PC A02/MF A01. Order Number DE83012470.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

An eight-pancake Nb-Ti dipole magnet, with bent up ends, called D-108B has been built and tested. This magnet is a Nb-Ti version of a Nb_3Sn magnet designed to produce a 10-tesla dipole field in a 40 mm diameter aperture. The pancack design is used for the heavy 12,000 ampere Nb_3Sn cable because of the mechanical difficulty in winding such a heavy cable into the conventional nested cylindrical shell configuration with a 2" inner winding diameter. The Nb-Ti version operates at 1.8K, in He II, has superconducting cable half as thick as the Nb_3Sn cable, and operates at half the operating current: 6000 A rather than 12,000 A at 10 tesla. Both magnets are approximately one meter long. D-10B was tested from January 26 to February 2, 1983 and reached short-sample performance in both He I and He II after moderate training. The central field at 4.3K is 7.0 (+- 0.1) tesla, and at 1.8K is 9.1 (+- 0.2) tesla. Ramp rate sensitivity and cyclic heating data were also measured.

34320 (LBL—15848) ECR heavy-ion source for the LBL 88-inch cyclotron. Clark, D.J.; Kalnins, J.G.; Lyneis, C.M. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 4p. (CONF-830311—121). NTIS, PC A02/MF A01. Order Number DE83011684.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Portions are illegible in microfiche products.

An Electron Cyclotron Resonance (ECR) heavy-ion source is under construction at the LBL 88-Inch Cyclotron. This source will produce very-high-charge-state heavy ions, such as O^{8+} and Ar^{12+}, which will increase cyclotron energies by a factor of 2-4, up to A = 80. It is a two-stage source using room-temperature coils, a permanent-magnet sextupole, and a 6-9 GHz microwave system. Design features include adjustable first-to-second-stage plasma coupling, a variable second-stage mirror ratio, high-conductance radial pumping of the second stage, and a beam-diagnostic system. A remotely movable extraction electrode will optimize extraction efficiency. The project includes construction of a transport line and improvements to the cyclotron axial-injection system. The construction period is expected to be two years.

34321 (SLAC-PUB—3073) Data acquisition using the 168/E. Carroll, J.T.; Cittolin, S.; Demoulin, M.; Fucci, A.; Martin, B.; Norton, A.; Porte, J.P.; Rossi, P.; Storr, K.M. (Stanford Linear Accelerator Center, CA (USA); European Organization for Nuclear Research, Geneva (Switzerland)). Mar 1983. Contract AC03-76SF00515. 15p. (CONF-830353—1). NTIS, PC A02/MF A01. Order Number DE83011514.

From Meeting on the impact of specialized processors in elementary particle physics; Padova, Italy (23 Mar 1983).

Event sizes and data rates at the CERN anti p p collider compose a formidable environment for a high level trigger. A system using three 168/E processors for experiment UA1 real-time event selection is described. With 168/E data memory expanded to 512K bytes, each processor holds a complete event allowing a FORTRAN trigger algorithm access to data from the entire detector. A smart CAMAC interface reads five Remus branches in parallel transferring one word to the target processor every 0.5 μs. The NORD host computer can simultaneously read an accepted event from another processor.

34322 Plans for Brookhaven fastbus during the next $\pi \times 10^{16}$ nanoseconds. Leipuner, L.B. (Brookhaven National Lab., Upton, NY); Larsen, R.; Makowiecki, D.; Morse, W.; Rudolf, T.; Sims, W.; Blatt, S.; Campbell, M.; Kasha, H.; Schmidt, M. *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **28**: No. 6, 4578-4580(Dec 1981). Contract AC02-76CH00016.

The work I will describe here is Brookhaven-Yale Fastbus. It has been used for about a year now at the AGS at Brookhaven to do all the data gathering for Experiment 735, a sensitive test of time reversal invariance in the decay $K^+ \rightarrow \mu^+ + \pi^0 + nu$. In this experiment we measure the direction of polarization of the μ^+ meson. Any component at all of this polarization out of the decay plane is an indication of time reversal invariance violation. The experiment will be completed this week, after running for about 1200 hours during the last year. We have processes over 20 million events through Fastbus and after the usual infant mortality failures the electronics has been remarkably stable.

34323 Semiconductor devices as track detectors in high energy colliding beam experiments. Ludlam, T. (Brookhaven National Lab., Upton, NY). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **NS-28**: No. 1, 549-553(Feb 1981).

In considering the design of experiments for high energy colliding beam facilities one quickly sees the need for better detectors. The full exploitation of machies like ISABELLE will call for detector capabilities beyond what can be expected from refinements of the conventional approaches to particle detection in high energy physics experiments. Over the past year or so there has been a general realization that semiconductor device technology offers the possibility of position sensing detectors having resolution elements with dimensions of the order of 10 microns or smaller. Such a detector could offer enormous advantages in the design of experiments, and the purpose of this paper is to discuss some of the possibilities and some of the problems. To give a specific context to the discussion, focus is given to applications for ISABELLE experiments, where the requirements are particularly severe and there is a clear need for a qualitative improvement in detector capability.

34324 Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). 290p. (CONF-810468—). Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, Piscataway, NJ 08854. Contract W-7405-ENG-26.

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The conference, in addition to status reports from various accelerator facilities, covered the following topics: acceleration tubes; gaseous insulation, control systems, pulsed beams, and ancillary technology; stripper foils; novel uses of electrostatic accelerators; ion sources; and future directions. Abstracts of individual items from the conference were prepared separately for the data base. (GHT)

34325 Nuclear structure facility at Daresbury. Voss, R.G.P. (Daresbury Lab., Warrington, England). pp 3-8 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

After the initial delays in construction, primarily due to the delay of approximately two years in the building and civil work, a revised program was established in October 1978. This revised program was maintained to within a few weeks until December 1980, when difficulties with high voltage tests led to a slippage of several months. This report is on the present status of the project, including the state of construction, and commissioning of various parts including the inital high voltage tests.

34326 Progress report on the XTU-tandem of the laboratori Nazionali di Legnaro. Signorini, C. (Lab. Nazionali di Legnaro I.N.F.N., Padova, Italy); Ricci, R.A. pp 12-16 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The accelerating tubes of the XTU-Tandem Van de Graaff generator at Legnaro have been tested up to about 14 MV. Carbon and proton beams have been accelerated with terminal voltages up to around 11 MV and currents of some hundreds nanoamperes.

34327 JAERI tandem accelerator facility. Maruyama, M. (Japan Atomic Energy Research Inst., Ibaraki). pp 17-22 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The 20MV heavy ion tandem accelerator is being installed at Tokai Research Establishment of Japan Atomic Energy Research Institute. It is the Model 20UR Pelletron folded tandem accelerator manufactured by National Electrostatics Corp. (NEC) in Wisconsin, USA. This project started in 1975 and JAERI placed the order of the accelerator at NEC in early 1976. Installation and test works have been continued since July 1978 and are now in the last stage. In this report an outline of the accelerator system is first explained and then results of the column voltage conditioning, of the accelerating tube conditioning and of the ion beam tests are described. Finally brief description of the experimental facilities is presented.

34328 Survey of large NEC accelerators: 1981. Weisser, D.C. (Australian National Univ., Canberra). pp 31-34 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A survey of the performance of large NEC accelerators is presented with emphasis on voltage performance and corona voltage distribution systems. The rf impedance of combination of accelerator tube, closed corona tube and column are discussed. The role played by SR_6 breakdown products systems is explored and new observations of deposits on corona needle tips are shown. Expectations of future performance of large NEC machines are given.

34329 Development of the Tandar project. Ferreira, E.P.; Mariscotti, M.A.J.; Ventura, E. (CNEA, Buenos Aires, Argentina). pp 42-45 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Progress on the installation of the Buenos Aires 20 MV Electrostatic Accelerator is proceeding at a rate consistent with its completion by 1982. About 90% of the civil engineering work on the accelerator tower is completed. The vessel has successfully passed pressure test up to 18 atm. Installation of the accelerator is due to start by the end of April 1981. An outline of the research program is also presented.

34330 Operation of the upgraded Stony Brook FN tandem. Noe, J.W. (New York State Univ., Stony Brook). pp 55-58 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A 20 MV superconducting LINAC is under construction at Stony Brook to extend the useful mass range of the existing FN tandem to $A \approx 100$. This paper describes the continuing program of improvements to the tandem design to enable it to serve as a stable, reliable source of nsec pulsed heavy-ion beams for injection into the LINAC. Already completed are installation of a Laddertron induction charging system and titanium spiral-inclined-field accelerator tubes and improvements to the vacuum system and column resistor. Tandem performance with the Laddertron and new tubes during the first 2900 hours of operation has been highly satisfactory. Final phase of the upgrading program will be the installation later in 1981 of a 400 kV ion-source table and double-drift harmonic buncher designed to capture $\sim$ 60% of the dc beam into 1 nsec pulses separated by 16 LINAC rf periods (106 nsec).

34331 Rehovot 14UD Pelletron: status report. Ben-Zvi, I.; Birk, M.; Dafni, E.; Hollos, G.; Kaim, R.; Sokolowski, J.S. (Weizmann Inst. of Science, Rehovot, Israel). pp 59-61 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

We report on recent improvements to our accelerator facility. These include insertion of an electrostatic triplet lens in the low energy mid-column, addition of a second foil stripper, and introduction of a new GVM stabilizer for low beam intensity operation of the machine. A beam pulsing system has been put into operation. This consists of a preacceleration 3.36 MHz chopper-buncher followed by a postacceleration 215 MHz copper cavity buncher. Beam bursts of 240 ps fwhm were obtained for ^{16}O ions.

34332 Status of the Cracow electrostatic accelerator project. Hebenstreit, J.R.; Kopczynski, J.P. (Jagellonian Univ Inst. of Physics, Cracow, Poland). pp 62-64 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The range of nuclear reaction measurements and applied interdisciplinary research performed earlier with accelerated particles in this Institute were strongly limited the accelerators being at disposal: an open air 1 MV Van de Graaff generator in the Jagellonian University and the cyclotron U-120 in the neighboring Institute of Nuclear Physics. Due to financial problems connected with buying a new ready accelerator, an approval was obtained for carrying out a detailed design study on condition that the accelerator should be constructed in the Institute and should be built of construction elements accessible in Poland. Having obtained the final approval of the project - tandem accelerator with 5 MV pressurized Van de Graaff generator, the construction was started in 1980. The investment period should be finished in 1982 with a single ended 5 MV accelerator. Simultaneously, the calculations and preparation for a tandem mode was begun. The gas handling system has just been made by the home industry and should be mounted and tested in 1981. The reconstruction of the building should be performed in the same time.

34333 First operation of the XTU-tandem 150 kv injector. Spolaore, P.; Signorini, C. (I.N.F.N., Laboratori Nazionali di Legnaro, Padova, Italy). pp 65-67 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The XTU-Tandem 150 kV injector has been recently tested, with a sputter source, at the Laboratori Nazionali di Legnaro. Its

operation turned out to be very reliable, with some minor troubles regarding the optimization of source gas leaking in case of difficult-to-sputter materials.

34334 **Status report on the cryogenic linear accelerator booster project at Florida State University.** Chapman, K.R. (Florida State Univ., Tallahassee). pp 68-70 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A superconducting linear accelerator booster is to be added to the existing super FN Tandem Van de Graaff Accelerator installation at Florida State University to achieve an effective 12MV additional acceleration voltage. A brief description of this booster and the reasons for this choice are given. The present status of this project is described.

34335 **VICKSI-operating experience and future plans.** Spellmeyer, B. (Hahn-Meitner-Inst. fuer Kernforschung Berlin GmbH., Glienicker StraBe, Germany). pp 71-73 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

For more than two years the VICKSI accelerator system is in routine operation. Improvements on different components of the system during this time allow to accelerate heavy ion beams of high energy e.g. 300 MeV ^{13}C, 400 MeV ^{20}Ne and 400 MeV ^{40}Ar. The availability of the accelerator system for experiments is about 55% of the operation time. The main limitation of VICKSI with respect to variety of ions, energy, and availability are given by the CN-Van de Graaff injector. Therefore the addition of a 8 UD Tandem as a second injector for the cyclotron is planned. The tandem-cyclotron combination will be able to accelerate ions with $A \leqq 35$ to energies up to 32 MeV/A and enlarge the variety of ions to be accelerated with VICKSI considerably.

34336 **Prebreakdown and breakdown processes in high vacuum accelerator tubes.** Chatterton, P.A. (Liverpool Univ., England). pp 77-86 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

This paper presents a review of the main vacuum insulation failure processes and relates them to their importance in accelerator tubes.

34337 **Physical properties and structure of carbon foils made by the dc glow discharge process.** Tait, N.R.S. (Daresbury Lab., Warrington, England). pp 155-157 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A review is given of the studies at a number of laboratories of the physical properties and structure of thin self-supporting carbon foils prepared by the dc glow discharge process. Included are studies of composition, photo-absorption in the infra-violet regions and electron beam diffraction. There is evidence that irradiation of the foils with heavy ions leads to the development particularly in the c-direction of small grpahite crystals. There is also some evidence that before irradiation there are present in the material single graphite-like layers aligned perpendicular to the foil surface.

34338 **Differences of amorphous and graphitized carbon foils in their stripper qualities.** Maier-Komor, P.; Ranzinger, E.; Muenzer, H. (Technische Univ. Muenchen, Germany). pp 163-167 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The influence of graphitization of carbon stripper foils on the quality of the analyzed heavy ion beam was investigated. 2 to 20 $\mu g/cm^2$ stripper foils prepared by electron gun evaporation techniques were graphitized by means of a Nd:YAG laser in a high vacuum system. Conventionally floated and mounted foils served as standards. The transmission of heavy ion beams through the Munich MP tandem was measured as function of thickness and degree of graphitization of stripper foils. Standard carbon foils treated by the light of a Nd:YAG laser show the same improvement in lifetime as glow discharge foils of identical thickness. In order to prove whether this is also the case for foils in a slackened version, a new technique was developed to slacken foils directly on their stripper frames. The spectral dependence of the optical transmittance was used to explain the alteration of the crystal structure due to the penetration by heavy ions. The loss of ion transmission, the expansion- and the contraction phase and last not least the rupture of the carbon stripper foil can now be explained consistently by crystal structure phenomena.

34339 **Comparative performance of stripper foils in the Argonne FN tandem.** DenHartog, P. (Argonne National Lab., IL); Thomas, G.; Henning, W.; Pardo, R.; Yntema, J.; Maier-Komor, P.; Tolfree, D. pp 168-171 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—). Contract W-31-109-ENG-38.

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Carbon stripping foils produced at Argonne, Chalk River, Daresbury, Heidelberg, Pittsburgh, and Munich have been tested in the terminal of the Argonne FN tandem at 7.7 MV using a ^{58}Ni beam. The foils tested were made by carbon arc evaporation, glow discharge cracking or laser bombardment of arc evaporated foils and used a variety of substrates and release agents. The ion transmission ratio, foil lifetime, and beam energy straggling were measured. The results will be presented and discussed.

34340 **Carbon foil behavior with I beams.** Frick, G. (Centre de Recherches Nucleaires, Strasbourg, France); Heusch, B.; Helleboid, J.M.; Niemeskern, A.; Wagner, P.; Baron, E.; Ricaud, C. pp 172 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Lifetime tests with carbon foils bombarded with a ^{127}I beam at 0.4 MeV/A.

34341 **Rare isotope detection and dating with tandem accelerators.** Litherland, A.E. (Toronto Univ., Ontario); Purser, K.H.; Gove, H.E. pp 175-183 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

Large tandem accelerators have been used successfully to pioneer mass spectrometric methods of extremely high sensitivity. The principles involved, some examples which have been studied and some implications for tandem accelerator technology will be discussed. 61 references.

34342 **Chalk River accelerator dating facility.** Andrews, H.R.; Ball, G.C.; Brown, R.M.; Burn, N.; Davies, W.G.; Imahori, Y.; Milton, J.C.D. (Chalk River Nuclear Labs., Ontario). pp 184-187 of Electrostatics accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

An automated system based on the MP Tandem accelerator has been developed for measurements of ^{14}C in small samples. Our present accuracy for $^{14}C/^{13}C$ ratio measurements is about 5% and the system background level corresponds to ages in the range of 33000 to 45000 years. Work is continuing to improve our accuracy, sample preparation techniques, and to understand and reduce the system background level.

34343 Toronto isotrace facility. Aardsma, G.E.; Beukens, R.P.; Chang, K.H. (Toronto Univ., Ontario). pp 188-191 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The Isotope and Rare Atom Counting Equipment Facility, currently being constructed at the University of Toronto, is the result of over four years of experimental work on tandem accelerator based ultrasensitive mass spectrometry carried out by a collaboration of researchers from the University of Toronto, the University of Rochester, and General Ionex Corporation. This paper lists the basic design aims of the core of ISOTRACE - the Mass and Charge Spectroscopy System being built by General Ionex Corporation (GIC), and will outline the additions to this system which are under development locally.

34344 Use of molecular ion beams from a tandem accelerator. Faibis, A.; Goldring, G.; Hass, M.; Kaim, R.; Plesser I.; Vager, Z. (Weizmann Inst. of Science, Rehovot, Israel). pp 196-198 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A large variety of positive molecular ion beams can be produced by gaseous charge exchange in the terminal of a tandem accelerator. After acceleration the molecules are usually dissociated by passage through a thin foil. Measurements of the break-up products provide a way to study both the structure of incident ions and the effects of electronic potentials on the internuclear interaction inside the foil. Beam intensities of a few picoamperes are quite adequate for these measurements, and the relatively high energy obtained by use of a tandem accelerator has the advantage of minimizing multiple scattering effects in the foil. The main difficulty in using the molecular beams lies in the large magnetic rigidity of singly-charged heavy molecular ions.

34345 Intense low energy heavy ion beams from a tandem dynamitron, Part II. Brand, K. (Ruhr-Univ. Bochum, Germany). pp 205-207 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

The heavy ion capability of the tandem Dynamitron system at Bochum has been remarkably improved by the installation of one of the new Middleton High Intensity Ion Sources on one of the open positions of the multiple source heavy ion injector.

34346 Negative ion beams of rare and radioactive isotopes. Kutschera, W. (Argonne National Lab., IL). pp 222-227 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—). Contract W-31-109-ENG-38.

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A review on the production of rare and radioactive ion beams for tandem accelerators is given. We consider any isotope as rare if the natural abundance is below 10%. 28 references.

34347 Another version of a negative ion sputter source. Balzer, R. (Lab. fuer Kernphysik, Eidg. Technische Hochschule, Zurich, Switzerland); Bonani, G.; Suter, M.; Beer, J. pp 235-237 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A negative ion sputter source has been constructed with particular emphasis on a high yield of negative ions and a fast and easy exchange of target samples. The basic lay-out follows the arrangement described by Mueller and Hortig. A cesium beam produced by a spherical surface ionizer and a 3-element acceleration lens impinges on a sputter target at an angle of 30°C. An additional cesium cell provides neutralization and supplies a certain amount of Cs to the target to give a good yield of negative ions. To minimize cross-talk of the materials of different targets due to sputtering, the samples in the source box are stored in a remote cassette at ground potential. By means of an insulated manipulator, the desired target is brought to the sputter position within a few seconds. The exchange of a target as well as the replacement of a cassette containing 25 targets takes place during full operation of the source.

34348 Improved miniature sputter source MISS-4. Matthes, H.; Pfestorf, W.; Steinert, L. (Central Inst. of Nuclear Research at Rossendorf, Germany). pp 242-244 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—).

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

After the Ebeltoft-Conference in 1978 at the Tandem-laboratory of the CINR at Rossendorf the construction was started of heavy ion sputter sources. The ion sources SQ1 and SQ2 were based on the Middleton and Richards sources, respectively. In spite of encouraging results obtained, these sources showed essential disadvantages. The main problems were the insufficient lifetime of the ionizer, a not particularly well focussed cesium-beam, a strong wear on the sputter cathodes and unreliability of the metal gaskets. For improving this type of source the experimental source SQ3 was developed permitting a systematic investigation of separate elements of the source.

34349 Why higher energies. Bromley, D.A. (Yale Univ., New Haven, CT). pp 264-279 of Electrostatic accelerator technology. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). (CONF-810468—). Contract AC02-76ER03074.

From 3. international conference on electrostatic accelerator technology; Oak Ridge, TN, USA (13 Apr 1981).

A new generation of large electrostatic accelerators - with and without postaccelerators - opens up entirely new domains in nuclear science. Some of these are illustrated in this paper using examples drawn from work with the largest existing facilities. These examples have been chosen, in part, to emphasize some of the unique features of the electrostatic accelerators; these include: dc beams, high energy resolution, rapid and convenient energy variability, flexibility in selection of beam species ranging from the lighest to the heaviest ions, low beam emittance, and high precision.

34350 Efficient neutron production using low energy electron beams. Bowman, C.D. (National Bureau of Standards, Washington, DC). *NBS Special Publication (United States);* No. 594, 531-533(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

A comparasion of (γ,n) and atomic cross sections shows that neutron production with an electron beam can be as energy efficient with 10 MeV electrons as with the conventionally used 30 to 100 MeV electrons. Neutron production from W using 100 MeV electrons is compared with a thin W converter followed by a deuterium-containing target using electron near 10 MeV.

34351 Performance improvements of the Geel Linac neutron source. Salome, J.M.; Boeckhoff, K.H. (Commission of the European Communities, Geel, Belgium). *NBS Special Publication (United States);* No. 594, 534-536(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The Geel Electron Linear Accelerator, acronymed GELINA, is a 150 MeV S-band linac which - together with its targets - serves as a pulsed neutron source in a multiple neutron time-of-flight spectrometer. It has recently been modernised with the aim of narrowing the electron burst widths down to 3 ns and of increasing the peak currents for the short bursts. The accelerator is shown schematically and its characteristic parameters are listed. Targets are described and future development plans are outlined. (WHK)

4304 Storage Rings

REFER ALSO TO CITATION(S) 34290, 34311

44 INSTRUMENTATION

4401 Radiation Instrumentation

REFER ALSO TO CITATION(S) 34300, 34301, 34321, 34323, 34390, 34468, 34473, 34474, 34519, 34520, 34533, 34536, 34538, 34539, 34541, 34542, 34546, 34675, 34866

34352 **(BNL—32788) Track chambers for high luminosity.** Ludlam, T.; Platner, E.D. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 7p. (CONF-830224—13). NTIS, PC A02/MF A01. Order Number DE83011648.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Portions are illegible in microfiche products.

The requirements for wire chambers as large-solid-angle tracking devices in a hadron collider at 10^{33} $cm^{-2}sec^{-1}$ luminosity are examined. The discussion begins with the known performance of the Axial Field Spectrometer drift chamber and the MPS II drift chamber system. Because of the high luminosity, a high degree of segmentation is required to limit the rate per wire and the sensitive time of the chambers. The high degree of segmentation is also needed for resolving individual tracks in jets. New electronics to accommodate a great number of readout channels are also discussed. (LEW)

34353 **(BNL—32847) Use of synchrotron radiation for electron identification at high luminosity.** Aronson, S. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 3p. (CONF-830224—10). NTIS, PC A02/MF A01. Order Number DE83011364.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Portions are illegible in microfiche products.

Synchrotron radiation has been used successfully to identify electrons of 10 to 30 GeV traversing a field length of 30 kG-m. Since comparable field lengths are a feature of many proposed collider detectors, and since this is an electron energy range of interest at $\sqrt{s} \approx 1$ TeV, we consider whether such a device could be useful in the $L = 10^{33}$ environment.

34354 (CONF-830130—, pp 262-268) **High efficiency electron spectrometer for atomic collision physics research.** Shafroth, S.M. (Univ. of North Carolina, Chapel Hill). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

A position sensitive parallel plate analyzer (PSPPA) with variable band width and energy resolution for angle resolved study of electrons produced in ion-atom collisions has recently been built and tested. This new spectrograph consists of a 30° parallel plate analyzer (PPA) equipped with a Chevron microchannel plate assembly with resistive anode encoding for one dimensional position analysis of electrons incident on the second order focal plane. It has an electron detection efficiency of over 100 times that of conventional PPA's. As an example of one use of this spectrometer, a beam foil experiment done at TUNL is described.

34355 (INIS-mf—7498, pp vp) **About the efficiency of a detector and the escape probability function.** Kwiat, D. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34356 (INIS-mf—7498, pp vp) **Possibility of p,chemical bond discrimination in a NE213 liquid sciatillator.** Tsechanski, A.; Shani, G. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34357 (INIS-mf—7498, pp vp) **Comparison of polycarbonate and CR-39 foils as passive detectors in the wide energy range personnel neutron dosimeter.** Eisen, Y.; Faermann, S.; Schlesinger, T.; Ovadia, E.; Weingarten, R.; Karpinovitch, Z.; Shamai, Y. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34358 (INIS-mf—7498, pp vp) **Development of a combined real-time neutron dosimeter in the 1 eV to 14 MeV energy region and a survey meter for high neutron dose rates.** Eisen, Y.; Engler, G.; Ovadia, E.; Shamai, Y. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34359 (INIS-mf—7498, pp vp) **Directional dependence of the wide energy range Rem response personnel neutron dosimeter.** Faermann, S.; Eisen, Y.; Tal, A.; Ovadia, E.; Schlesinger, T. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34360 (INIS-mf—7498, pp vp) **Saturation effects in polycarbonates irradiated at high doses.** Faermann, S.; Eisen, Y.; Weingarten, R.; Schlesinger, T. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center); Kushilevski, A. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34361 (INIS-mf—7498, pp vp) **Performance of the wide energy Rem response personnel neutron dosimeter.** Eisen, Y.; Shamai, Y.; Faermann, S.; Ovadia, E.; Tal, A. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34362 (INIS-mf—7498, pp vp) **Passive spectrometer for fast neutrons in the energy range 0.5-14 MeV.** Faermann, S.; Eisen, Y.; Schlesinger, T. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center); Kushilevski, A. (Ben-Gurion Univ. of the Negev, Beersheba (Israel). Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34363 (INIS-mf—7498, pp vp) **Facility for calibration of protection-level radiation instruments.** Shamai, Y.; Klopfer, J.; Khastar, P. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34364 (INIS-mf—7498, pp vp) **Passive neutron waste monitoring system.** Shenhav, N.; Leiferman, G. (Technion-Israel Inst. of Tech., Haifa. Dept. of Nuclear Engineering). 1982. NTIS (US Sales Only), PC A12/MF A01. (CONF-820268—Vol.9).

From Nuclear societies of Israel joint annual meeting; Haifa, Israel (16 Feb 1982).

34365 (INIS-mf—7499, pp vp) **Monte Carlo calculation of energy dependence for efficiency of moderating neutron detectors.** Fueloep, M. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava (Czechoslovakia)). 1980. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34366 (INIS-mf—7499, pp vp) **Energy dependence of some current personnel neutron dosemeters.** Charvat, J.; Spurny, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni); Prouza, Z. (Karlova Univ., Prague (Czechoslovakia). Biofyzikalni Ustav). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34367 (INIS-mf—7499, pp vp) **Effect of annealing on sensitivity of some thermoluminescent dosemeters to ^{60}Co gamma radiation.** Kubu, M. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava (Czechoslovakia)). 1980. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34368 (INIS-mf—7499, pp vp) **Use of Ge(Li) spectrometry in monitoring personnel and environment. I.** Malatova, I.; Bucina, I. (Institut Hygieny a Epidemiologie, Prague (Czechoslovakia). Ustav Hygieny Zareni). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34369 (INIS-mf—7499, pp vp) **Application of TL evaluation equipment in personnel dosimetry - type NHZ-203 imported from Hungary.** Singer, J. (Zavod pro Pripravu Provozu a Kadru Jadernych Vyroben CEZ, Dukovany (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34370 (INIS-mf—7499, pp vp) **Response of some detectors to thermal neutrons.** Spurny, F.; Charvat, J.; Turek, K. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34371 (INIS-mf—7499, pp vp) **Experience with work with double ionization chambers.** Spurny, F.; Votockova, I. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34372 (INIS-mf—7499, pp vp) **Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron).** Spurny, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni); Prouza, Z. (Karlova Univ., Prague (Czechoslovakia). Biofyzikalni Ustav); Nikodemova, D. (Vyskumny Ustav Preventivneho Lekarstva, Bratislava (Czechoslovakia)); Doerschel, B. (Technische Univ., Dresden (German Democratic Republic)). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34373 (INIS-mf—7499, pp vp) **Other possibilities of applying solid state track detectors in neutron dosimetry.** Turek, K.; Spurny, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Dozimetrie Zareni). 1980. (In Czech). NTIS (US Sales Only), PC A07/MF A01. (CONF-8010311—Absts).

From 10. radiation hygiene days conference; Vranov nad Dyji, Czechoslovakia (7 Oct 1980).

34374 (INIS-mf—7500, pp vp) **Sensitivity limits in gamma-ray spectroscopy.** Hnatowicz, V. (Ceskoslovenska Akademie Ved, Rez. Ustav Jaderne Fyziky). [nd]. NTIS (US Sales Only), PC A04/MF A01.

In VIth Czechoslovak spectroscopic conference. Abstracts.

34375 (INIS-mf—7500, pp vp) **NOI-6 N-15 analyzer.** Meier, G.; Mauersberger, K. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). [nd]. NTIS (US Sales Only), PC A04/MF A01. (CONF-8009295—Absts).

From 6. Czechoslovak spectroscopic conference; Nitra, Czechoslovakia (1 Sep 1980).

34376 (INIS-mf—7501, pp vp) **Monitoring of deactivation stations in nuclear power plants.** Prochazka, H.; Jirasek, V.; Prochazka, J.; Veit, M. (Vyzkumny Ustav Veterinarniho Lekarstvi, Brno-Medlanky (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

A method was developed for low level counting of radionuclides in water, based on the concentration of the characteristic nuclide or a group of nuclides on the ion exchanger solid bed. The ion exchanger column is adjusted for direct measurement using a large-volume well-type NaI(Tl) detector connected to a multichannel amplitude analyzer. Examples are shown of measuring concentrations of ^{137}Cs and ^{226}Ra. The results show that within the measured concentrations the relative error does not exceed 50%, which can be considered satisfactory. (J.B.).

34377 (INIS-SU—122, pp vp) **Streamer spectrometer for the study of rare neutron reactions.** Mikhajlov, M.N.; Troshev, T.M.; Trifonov, A.I.; Khristov, V.I.; Yanev, T.B. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika); Falomkin, I.V.; Shcherbakov, Yu.A. (Joint Inst. for Nuclear Research, Dubna (USSR)). 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Nuclear constants.

A streamer spectrometer is described. The basis of the spectrometer is a streamer chamber of 30x20x10 cm filled with the gas-target and placed in a magnetic field. The spectrometer is intended for the detection and photographing of tracks of electron-positron pairs of inner conversion when capturing thermal neutrons with argon and hydrogen nuclei. The gas-filled chamber is the target, what permits to get the possibility for the observation of the point of pair emission and provides good conditions for angular and energy measurements.

34378 (LBL—14986, pp 12-14) **New instrumentation for high-resolution, dynamic, three-dimensional tomography of positron-labeled compounds in the human body.** Derenzo, S.E.; Cahoon, J.L.; Huesman, R.H.; Vuletich, T.; Budinger, T.F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

A new ultra-high resolution positron tomograph is being built to study human brain and heart physiology. The complete instrument will consist of four rings each having 600 detector crystals 3 mm wide. Unfortunately, because there are no photomultiplier tubes small enough to read out close-packed arrays of such fine scintillation crystals there is a major research effort to develop alternate technologies. During the investigation of high technology readout approaches we will proceed to build a single-ring system using 14 mm diameter phototubes.

34379 **(LBL—15866) Large-area non-crystalline semiconductor detectors.** Perez-Mendez, V.; Mulera, T.; Kaplan, S.N.; Wiedenbeck, P. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 4p. (CONF-830224—12). NTIS, PC A02/MF A01. Order Number DE83011673.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The properties of various non-crystalline semiconductors are considered for use as position-sensitive detectors. Amorphous silicon and conducting plastic can be doped to form NP depletion regions similar to those in single crystal silicon, but without the limitation of single-crystal size. Chalcogenide glassy materials such as Te-Se-Ge compounds as well as some metallic oxides such as the Vanadium oxides have switching and memory properties. They could serve as x,y location identifying devices when triggered by amplified pulses from a parallel plate or multistep gas-filled detector stage in order to resolve the multitrack ambiguity for x,y readout schemes.

34380 **$^{127}I(n,2n)^{126}I$ reaction as a fast neutron flux monitor.** Santry, D.C. (Chalk River Nuclear Laboratories, Ontario). *NBS Special Publication (United States);* No. 594, 433-435(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The activation method was used to measure the production of 12.88 day ^{126}I as a function of neutron energy. Monoenergetic neutrons were produced with a tandem Van de Graaff using the reaction $D(d,n)^3He$ and $T(d,n)^4He$. Cross sections were measured from a threshold energy of 9.2 MeV up to 20 MeV relative to the known cross sections for the $^{32}S(n,p)$ reaction. The study has shown that the $^{127}I(n,2n)$ reaction has a flat response around 14 MeV and this factor combined with the suitable decay characteristics of ^{126}I provides a reaction suitable as a standard for determining integrated fast-neutron fluxes of neutron generators and thermonuclear fusion machines.

34381 **Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers.** Cecil, F.E.; Killian, K.; Rymes, M. (Colorado School of Mines, Golden). *NBS Special Publication (United States);* No. 594, 509-511(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The utilization of NaI(Tl) scintillators as a high efficiency, fast neutron monitor, through the reaction $^{127}I(n,n')^{127}I^4$(E/sub x/ = 57 keV)^{127}I(E/sub x/ = 0), has been established. The total gamma ray production cross sections for the 57 keV gamma ray in ^{127}I by inelastic scattering of 3 MeV and 14 MeV neutrons are 0.43 +- 0.04 b and 0.28 +- 0.03 b respectively. Temperature and count rate limitations on this utilization have been determined. The same reaction should allow HgI_2 semiconductor gamma ray detectors with intrinsic energy resolution potentially far superior to NaI(Tl) to be utilized to monitor fast neutrons.

34382 **New fission fragment detectors for cross section and angular distribution measurements at CBNM.** Knitter, H.H.; Budtz-Jorgensen, C. (Commission of the European Communities, Geel, Belgium). *NBS Special Publication (United States);* No. 594, 947-955(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The accurate knowledge of the fission cross section of the highly active minor actinides belonging to the uranium based fuel cycle are of growing importance as the nuclear industry matures. For the measurement of such cross sections two fission fragment detectors are described which can be used in the presence of very high alpha backgrounds rates. For the understanding of the physics of the fission process, angular and energy distribution measurements can be helpful, for example for the determination of the quantum numbers J and K of the transition states. For this purpose as a detector was developed which has an angular efficiency of 2 π, an angular resolution of 5 % on cos θ, and energy resolution of 1.5 % and a timing resolution sufficient for the application in time-of-flight experiments.

34383 **Parasitic absorption and leakage corrections for $MnSO_4$ baths.** Goldstein, H.; Chen, L. (Columbia Univ., New York, NY). *NBS Special Publication (United States);* No. 594, 988-989(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Using ENDF/B-V cross sections plus new evaluations for sulfur, corrections for fast neutron absorption and leakage have been calculated for measurements of anti nu by the $MnSO_4$ bath techniques. Transport calculations were performed in spherical geometry, chiefly with ANISN, using a specially devised 118 group cross section set.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

34384 **(SAND—82-2795C) Space-charge effects in irradiated Si_3N_4 films.** Hughes, R.C. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 11p. (CONF-830508—17). NTIS, PC A02/MF A01. Order Number DE83011860.

From 163. Electrochemical Society meeting; San Francisco, CA, USA (8 May 1983).

Irradiation of Si_3N_4 films on Si (MNOS devices) causes photoconductivity due to the production of electron-hole pairs. Since there are extremely large numbers of both electron and hole traps in Si_3N_4, this photocurrent is difficult to observe, but can result in charging of the Si_3N_4-Si interface. Solutions of the photoconductivity equations including diffusion, recombination, drift and trapping of the electron-hole pairs are presented and compared with experimental data on the charging of MNOS devices under irradiation.

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 32964, 32965, 32998, 33442, 33587, 33615, 33679, 34517, 34795, 34863, 34882

34385 **(BMFT-FB-T—82-158) Microelectronic temperature sensor; silicon temperature sensor.** Beitner, M.; Kanert, W.; Reichert, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 54p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750080.

The goal of this work was to develop a silicon temperature sensor with a sensitivity and a reliability as high and a tolerance as small as possible, for use in measurement and control. By employing the principle of spreading-resistance, using silicon doped by neutron transmutation, and trimming of the single wafer tolerances of resistance less than +- 5% can be obtained; overstress tests yielded a long-term stability better than 0.2%. Some applications show the advantageous use of this sensor.

34386 **(DOE/NV/10282—T2) Aerial testing of KrF-laser-based fluorosensor.** Capelle, G.A.; Franks, L.A.; Jessup, D.A. (EG and G, Inc., Goleta, CA (USA)). 1981. Contract AC08-83NV10282. 27p. NTIS, PC A03/MF A01. Order Number DE83011890.

An airborne two-channel KrF laser fluorosensor was tested from a Convair 580-T over targets at the Nevada Test site, and at the Naval Petroleum Reserve and Santa Barbara Channel in California. The two spectral-channel system (295 and 395 nm) successfully detected a variety of pollutant-type materials on the ground, both at night and in full daylight.

34387 **(RFP—3499) Calibration of and conversion charts for Matheson rotameters.** Affatica, J.P. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 9 May 1983. Contract AC04-76DP03533. 16p. NTIS, PC A02/MF A01. Order Number DE83012431.

To establish uniformity in the calibration of Matheson Series 600 rotameters, a project was undertaken to collect and combine calibration dta on rotameters of the same type. This also serves to eliminate the many individual charts that have been issued in the past and will help to avoid any confusion in the specification of float height and flow rate. Past calibration data, as-well-as new data, on rotameters of the same tube size, float material, and gas, was combined in a computer program utilizing the least squares method of curve fitting. The best fit curve was selected and a conversion chart of float height to flow rate was printed. The report includes a description of the calibration process and the error analysis involved. Since the finalization of the conversion charts and the assigning of tolerances, newly purchased rotameters have been calibrated and issued. All Matheson Series 600 rotameters are being calibrated to, and issued with, these standard charts.

34388 **Life beyond 1 MeV.** Westmacott, K.H. (Lawrence Berkeley Lab., CA). pp 30-33 of Thirty-eighth annual proceedings of the electron microscopy society of America. Bailey, G.W. (ed.). San Francisco, CA; Electron Microscopy Society of America (1980). Contract W-7405-ENG-48.

A good case can be made for investing in instruments with a range of maximum accelerating voltages. In this regard, the 1.5 MeV KRATOS HVEM being installed in Berkeley will complement the other 650 KeV, 1 MeV, and 1.2 MeV instruments currently operating in the US. One other consideration suggests that 1.5 MeV is an optimum voltage machine - its additional advantages may be purchased for not much more than a 1 MeV instrument. On the other hand, the 3 MeV HVEM's, which seem to be operated at 2 MeV maximum, are much more expensive. Uses of HVEM are reviewed.

4404 Well Logging Instrumentation

34389 **(USGS-OFR—78-515) Computer program for borehole compensation of dual-detector density well logs.** Scott, J.H. (Geological Survey, Denver, CO (USA)). [nd]. 8p. US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO.

The computer program described in this report was developed for applying a borehole-rugosity and mudcake compensation algorithm to dual-density logs using the following information: the water level in the drill hole, hole diameter (from a caliper log if available, or the nominal drill diameter if not), and the two gamma-ray count rate logs from the near and far detectors of the density probe. The equations that represent the compensation algorithm and the calibration of the two detectors (for converting countrate or density) were derived specifically for a probe manufactured by Comprobe Inc. (5.4 cm O.D. dual-density-caliper); they are not applicable to other probes. However, equivalent calibration and compensation equations can be empirically determined for any other similar two-detector density probes and substituted in the computer program listed in this report.

34390 **Neutron induced radioactivity for mineral exploration.** Senftle, F.E. (US Geological Survey, Reston, VA). *NBS Special Publication (United States);* No. 594, 604-614(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Borehole neutron activation-gamma-ray spectrometry is a useful method for mineral exploration. Isotopic or accelerator neutron sources are used with either scintillation or semiconductor detectors in the borehole tools depending on the application, rock formation, required measurement time, etc. The basic neutron processes in rock formations are summarized to point out the problem of spectrometer calibration. The source-to-detector distance is an important consideration to achieve optimum sensitivity. There are several possible solutions of the calibration problem. Some of these are demonstrated by applications of neutron activation to mineral exploration in the field. Although many problems still need to be solved to make borehole neutron-gamma-ray spectrometry a more general analytical tool, the method is a powerful qualitative exploration device applicable to many elements in most rock formations. Under certain conditions, e.g., in a coal seam, it can also be a good quantitative tool. 83 references.

45 EXPLOSIONS AND EXPLOSIVES

4501 Chemical

34391 **Equation of state from detonation velocity measurements.** Davis, W.C. (Los Alamos Scientific Lab., NM). *Combustion and Flame;* **41**: 171-178(1981).

An analysis is presented to show that a complete equation of state can be obtained from the measured Chapman-Jouguet detonation velocity presented as a function of initial density and energy. Derivations are given in detail, and several examples are discussed.

34392 **New adducts of 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX).** Selig, W. (Lawrence Livermore National Lab., CA). *Propellants and Explosives;* **6**: 1-4(1981). Contract W-7405-ENG-48.

Relatively stable equimolar adducts of 1,3,5-trinitro-1,3,5-triazacyclohexane were prepared with 2,6-lutidine-N-oxide, 4-hydroxy-1-butanesulfonic acid δ-sultone (1,4-butane sultone), and 2,2,6,6-tetramethyl-4-peperidone-1-oxyl. Only the last adduct is selective for RDX; the others also form aducts with 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane. A very labile RDX adduct is formed with tetrahydrothiophene-1-oxide. Some properties of the new adducts are presented.

4502 Nuclear

REFER ALSO TO CITATION(S) 33011

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

REFER ALSO TO CITATION(S) 33843, 34182

34393 **(AD-A—121482/4) Automatic meteorological station system AN/TMQ-30 ( ). Final report.** Vechione, W.J. (Army Electronics Research and Development Command, White Sands Missile Range, NM (USA). Atmospheric Sciences Lab.). Aug 1982. 51p. NTIS, PC A04/MF A01.

The AN/TMQ-30 Automatic Meteorological Station is a system consisting of a master station and 20 to 36 remote sensor stations. This system is designed to supplement surface observations within an Army division's zone of responsibility. The remote stations transmit, via digital radio frequency (RF) link, wind speed and direction, temperature, relative humidity, and pressure data to the master station. The Remotely Monitored Battlefield Sensor System (REMBASS) data transmission scheme is incorporated into the AN/TWQ-30. Transmission times are set hourly or half-hourly, with a mission duration after deployment of 14 days. Microprocessor data control and processing are used throughout the system

concept, both in the remote sensor stations and the master station. Currently, the system is in the advanced development stage. Hardware development was completed Jan 81. Acceptance and operational tests were accomplished between Feb and May 81. These tests included in-plant acceptance, specification compliance, and operational capability tests. Data collected were compared to calibrated standards. Presented are all tabulated and graphic representations, as well as field operation results. The results of the tests show the system's relative comparison with the standards. The future plans for system development are presented.

34394 **(DFVLR-MITT—82-09) Radar meteorology in cloud physics and radio wave propagation research.** Schroth, A. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.). Inst. fuer Hochfrequenztechnik). 1982. 344p. (In German). NTIS (US Sales Only), PC A15/MF A01. Order Number DE83750378.

Portions are illegible in microfiche products.

After a brief discussion of the tasks for weather radars in meteorology and radio wave propagation research the most important stages of development beginning with the standard weather radar up to the agile coherent polarization-diversity radar, the sensor of the future, are presented. The basic design, the range of application and the limitations of the different devices are investigated. The latest theorie under use for the system design of a coherent polarization radar and the interpretation of the measured datas is shown in detail. The essential parameters and their influences on the design of such devices are discussed. A proposal for realization and the values of the significant radar parameters are given.

34395 **(N—8231727) Mount St. Helens aerosol evolution.** Oberbeck, V.R.; Farlow, N.H. (National Aeronautics and Space Administration, Moffett Field, CA (USA). Ames Research Center). Aug 1982. 15p. (NASA-TM—84265; A—8981). NTIS, PC A02/MF A01.

Stratospheric aerosol samples were collected using a wire impactor during the year following the eruption of Mount St. Helens. Analysis of samples shows that aerosol volume increased for 6 months due to gas-to-particle conversion and then decreased to background levels in the following 6 months.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 33022, 33044, 33060, 33062, 33063, 33276, 33800, 34068, 34077, 34098, 34254, 34420, 34449, 34631, 34632

34396 **(CONF-830459—1) Compositional changes in red and violet smoke mixes after combustion.** Buchanan, M.V.; Rubin, I.B.; Moneyhun, J.H. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 11p. NTIS, PC A02/MF A01. Order Number DE83011388.

From 7. smoke/obscurants symposium; Adelphi, MD, USA (26 Apr 1983).

Anthraquinone-derived dyes are commonly used in colored dye mixes prepared for signal smoke grenades. Biological studies have shown, however, that a number of these dyes exhibit bacterial mutagenicity. In addition, these dyes are similar in structure to several polycyclic aromatic hydrocarbons which are well-known carcinogens. The grenades contain not only anthraquinone-derived dyes, but also a pyrotechnic fuel and cooling and starting mixes consisting primarily of potassium chlorate and nitrate, sodium bicarbonate, and sulfur. These dyes are volatilized at temperatures up to 550°C during the detonation of the grenade, which could subject the dyes to oxidative and pyrolytic reactions that could result in a variety of reaction by-products. As part of a program to investigate possible environmental and occupational risks of the colored smoke dyes and in signal grenades, two colored smoke mixes, red and violet, have been studied both before and after detonation to evaluate any differences in composition due to the combustion process. This report focuses primarily on the separation and identification of the components of the original and combusted red and violet smoke mixes. The conditions for the detonation of the smoke grenades and sampling of the combusted smoke mixes are also discussed.

34397 **(DP-MS—82-93) Two-dimensional simulation of drainage flow and tracer gas transport in the Geysers area.** Smith, F.G.; Garrett, A.J. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 20p. (CONF-830307—18). NTIS, PC A02/MF A01. Order Number DE83011223.

From 6. American Meteorological Society symposium on turbulence and diffusion; Boston, MA, USA (22 Mar 1983).

A simplified two-dimensional dynamical drainage flow model has been coupled with Monte Carlo transport and diffusion calculations to predict pollutant dispersion in drainage flow. The equations of motion and the mass continuity equation in a terrain-following coordinate system form the basis for the dynamical model. Model simulations of drainage flow and tracer gas transport were compared to observations from the 1980 ASCOT experiment in the Geysers area of northern California. The drainage flow simulations were made on a square grid 7 km on a side. The computational domain covered the drainages of Putah Creek, Gunning Creek, Anderson Creek, and Bear Canyon Creek, plus several other smaller canyons on the slopes of Cobb Mountain and the Mayacmas Mountains.

34398 **(EPRI-CS—2897-Vol.1, pp 269-283) Continuous emission monitoring of flue gas desulfurization systems.** Westlin, P.R. (Environmental Protection Agency, Research Triangle Park, NC). Mar 1983. NTIS, PC A19/MF A01. (CONF-820551—Vol.1).

From EPA/EPRI symposium on flue gas desulfurization; Hollywood, FL, USA (17 May 1982).

The Environmental Protection Agency (EPA) has conducted continuous emission monitoring (CEM) studies of varying durations at many flue gas desulfurization (FGD) units. These include eight electric utility size units tested in support of the development of the 1979 new source performance standard (NSPS) (40 CFR Part 60, Subpart Da) for limiting sulfur emissions from electric utilities. Other units include four utility FGD demonstration projects conducted since promulgation of Subpart Da. The EPA has also undertaken a 1-year demonstration of CEM operation on a full-scale FGD system. This CEM system is a complete demonstration of the monitoring requirements of Subpart Da. Further, EPA is revising the evaluation methods and specifications for certifying CEM systems to include knowledge learned in the Agency's and other field test programs. 4 figures, 2 tables.

34399 **(LUTFD2/TFKF—3021/1-120/79) Composition of the aerosol of a clean air region. Final report.** Lannefors, H.; Hansson, H.C. (Tekniska Hoegskolan, Lund (Sweden). Institutionen foer Kaernfysik). [nd]. 110p. (In Swedish). NTIS (US Sales Only), PC A06. Order Number DE83750463.

Paper copy only, copy does not permit microfiche production.

The aerosol composition as a function of particle size, has been studied at a rural location in southern Sweden, during a one year cycle. The sulfur and heavy metal concentrations have been measured in 113 cascade impactor samples by particle induced X-ray emission (PIXE). Elemental concentrations varied over two orders of magnitude between individual samples. Yearly average concentrations are one to two orders of magnitude lower than in larger urban regions except for sulfur which is in the same order of magnitude. Seasonal variations were very small. Air-mass trajectory analysis reveals a factor of 2-10 higher concentrations in air masses originating from the European Continent or Great Britain compared to air masses from the North Atlantic. Calculations of washout factors and an estimation of the dry deposition have been made based on yearly average concentrations.

34400 **(ORNL—5999) Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.** (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 253p. NTIS, PC A12/MF A01. Order Number DE83010394.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Separate abstracts were prepared for 12 of the 14 sections of the Environmental Sciences Division annual progress report. The

other 2 sections deal with educational activities. The programs discussed deal with advanced fuel energy, toxic substances, environmental impacts of various energy technologies, biomass, low-level radioactive waste management, the global carbon cycle, and aquatic and terrestrial ecology. (KRM)

34401 (ORNL—5999, pp 90-103) **Global carbon cycle program.** Reichle, D.E.; Trabalka, J.R. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The principal purpose of this program is to develop a quantitative basis for understanding the global biogeochemical cycle of carbon and implementing simulation models to describe its dynamic behavior. Another objective of this research is to further the scientific methodology for assessing the response of CO_2 by fossil-fuel combustion. Research is being supported both by DOE and the National Science Foundation (NSF). Mathematical models of the carbon cycle are being developed and updated with refinements in basic understanding and improved estimates of key parameters. Sensitivity and error analyses provide a basis for selecting aspects of models that require refinement. Basic data sets underlying carbon-cycle models are refined and augmented where indicated. Particular attention in this program is given to improving our understanding the terrestrical component of the cycle. In this regard, the impacts of land-use change and climate on the global carbon cycle are also major areas of concern.

34402 (ORNL/TM—8749) **Chemical characterization of the smokes of selected US commercial cigarettes: tar, nicotine, carbon monoxide, oxides of nitrogen, hydrogen cyanide, and acrolein.** Jenkins, R.A.; White, S.K.; Griest, W.H.; Guerin, M.R. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 44p. NTIS, PC A03/MF A01. Order Number DE83012139.

Thirty-two brands of US commercial cigarettes were analyzed for their deliveries of tar, nicotine, CO, CO_2, HCN, NO/sub x/, and acrolein under standard smoking conditions. Per cigarette and per puff deliveries were calculated. The sample suite contained filtered and non-filtered varieties, and relatively popular high, low, and medium tar delivery cigarettes. The range of deliveries of these constituents was considerable. Statistical analysis indicated that the deliveries of nicotine, CO, NO/sub x/, and HCN could usually be estimated to within 50% of their actual delivery if the tar delivery was known. However, brand to brand variation in the constituent ratios was sufficient so as to preclude the exact calculation of the delivery of one component from that of another.

34403 (PB—83-126383) **Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado.** Hartle, R. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1981. 38p. NTIS, PC A03/MF A01.

On October 16, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request from the City of Colorado Springs Department of Public Utilities for a 'baseline' environmental evaluation of two coal-fired electrical power production facilities. These substances included fly ash, coal dust, free silica, flue gases, trace metals, and boiler feed-water chemicals. Based on the environmental data collected at these facilities, NIOSH determined that a potential health hazard existed at both plants from overexposure to fly ash and coal dust containing free silica, and to inorganic arsenic, cristobalite, sulfur dioxide, and hydrazine at the Martin-Drake facility. Recommendations for control of excessive exposures are made.

34404 (PB—83-132910) **Personal passive monitors for chemical agents. Technical report.** Woebkenberg, M.L. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Physical Sciences and Engineering). Sep 1980. 24p. NTIS, PC A02/MF A01.

Small lightweight passive personal monitoring devices for chemicals such as sulfur-dioxide (7446095) and mercury (7439976) are discussed. Such monitors function by diffusion and permeation and are worn on the collar, lapel, or pocket by the worker. Some register single and some record multiple chemicals. Some give measurements at work, while others require laboratory analysis. Ten inorganic, five organic, and two general monitors are described. Response, such as alarm or color change, the particular laboratory analysis, the recommended exposure limits, the collection mechanism, and the manufacturer are presented. The authors conclude that interfering compounds in the atmosphere make it important to determine which device will best protect the health of the workers by its accuracy.

34405 (PB—83-137190) **Evaluation of a prototype portable microwave multi-gas analyzer. Technical report.** Breuer, G.M. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Physical Sciences and Engineering). Aug 1981. 31p. NTIS, PC A03/MF A01.

An evaluation of a portable microwave multigas analyzer for its efficacy in measuring air contaminants in a workplace environment is presented. The evaluation focused on portability for field use; and versatility for several compounds including acetonitrile (75058), acetaldehyde (75070), acetone (67641), carbonyl-sulfide (468581), ethanol (64175), ethylene-oxidde (75218), isopropanol (67630), methanol (67561), propylene-oxide (75569), and sulfur-dioxide (7446095) stability of measurement; simplicity of use. The authors conclude that versatility and simplicity of operation were adequate, but stability and portability were not. They suggest a program for improvement.

34406 (UCID—18874-80-Vol.1) **ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I.** Gudiksen, P.H. (ed.). (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 538p. (ASCOT—83-1-Vol.1). NTIS, PC A23/MF A01. Order Number DE83011880.

Portions are illegible in microfiche products.

This report provides a listing of the data acquired during a series of nocturnal drainage flow experiments that were conducted by ASCOT participants in the Anderson Creek valley during September 1980. These experiments were designed to evaluate the transport and dispersion characteristics associated with nocturnal drainage flows. The report includes data from meteorological measurements systems and tracer experiments. The meteorological data include measurements from tethersondes, acoustic sounders, meteorological towers, pilot balloons, optical anemometers, and rawinsondes; while the tracer experiments provided data on the spatial and temporal distributions of perfluorocarbon, heavy methane, sulfur hexafluoride oil fog, tetroons, and radon tracers.

34407 (UCID—18874-80-Vol.2) **ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II.** Gudiksen, P.H. (ed.). (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 565p. (ASCOT—83-1-Vol.2). NTIS, PC A24/MF A01. Order Number DE83011879.

Portions are illegible in microfiche products.

This report provides a listing of the data acquired during a series of nocturnal drainage flow experiments that were conducted by ASCOT participants in the Anderson Creek valley during September 1980. These experiments were designed to evaluate the transport and dispersion characteristics associated with nocturnal drainage flows. The report includes data from meteorological measurements systems and tracer experiments. The meteorological data include measurements from tethersondes, acoustic sounders, meteorological towers, pilot balloons, optical anemometers, and rawinsondes; while the tracer experiments provided data on the spatial and temporal distributions of perfluorocarbon, heavy methane, sulfur hexafluoride, oil fog, tetroons, and radon tracers.

34408 (UCID—18874-80-Vol.3) **ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III.** Gudiksen, P.H. (ed.). (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 489p. (ASCOT—83-1-Vol.3). NTIS, PC A21/MF A01. Order Number DE83011886.

Portions are illegible in microfiche products.

This report provides a listing of the data acquired during a series of nocturnal drainage flow experiments that were conducted

by ASCOT participants in the Anderson Creek valley during September 1980. These experiments were designed to evaluate the transport and dispersion characteristics associated with nocturnal drainage flows. The report includes data from meteorological measurements systems and tracer experiments. The meteorological data include measurements from tethersondes, acoustic sounders, meteorological towers, pilot balloons, optical anemometers, and rawinsondes, while the tracer experiments provided data on the spatial and temporal distributions of perfluorocarbon, heavy methane, sulfur hexafluoride, oil fog, tetroons, and radon tracers.

34409 **Air sampling and liquid chromatographic determination of ethylenimine.** Morales, R.; Stampfer, J.F.; Hermes, R.E. (Los Alamos National Lab., NM). *Analytical Chemistry;* **54**: 1340-1344(1982).

Sampling and analytical methods are described for the determination of airborne exposures of individuals to ethylenimine - an OSHA designated carcinogen. The personal sampler consists of a midget bubbler containing Folin's reagent capable of quantitatively absorbing ethylenimine vapors. The derivatized imine is extracted with chloroform and determined by high-performance liquid chromatography. The method was evaluated with dynamically generated samples in the range of 1.2-794 μg/sample and yielded an average recovery of 92.1% with a pooled coefficient of variation of 0.042.

34410 **Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur.** Shannon, J.D. (Argonne National Lab., IL). pp 136-137 of Fifth symposium on turbulence, diffusion, and air pollution. Boston, MA; American Meteorological Society (1981).

From 5. symposium on turbulence, diffusion, and air pollution; Atlanta, GA, USA (9 Mar 1981).

A network of 4 stations, initially with 4 others added, for investigation of deposition of chemical pollutants is associated with the Multistage Atmospheric Power Production Pollution Study (MAP3S). An objective method for determining where to add more stations is described herein. The area being considered is defined by a grid along with the weighting function, which is a fourth-order polynomial fitted to modeled wet deposition of total sulfur from a model proposed by Shannon in 1980. The positions of the 4 additional sites are optimized both sequentially and simultaneously. A summary of variance explanation by expanded networks indicated that additional stations gradually decrease in incremental value to the network. (BLM)

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 33259, 34424, 34429, 34449, 34462, 34601

34411 (CONF-820418—, pp 513-530) **Validation of annual average air concentration predictions from the AIRDOS-EPA computer code.** Miller, C.W.; Fields, D.E.; Cotter, S.J. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

The AIRDOS-EPA computer code is used by the Industrial Safety and Applied Health Physics Division of Oak Ridge National Laboratory (ORNL) to assess the annual doses to the general public resulting from releases of radionuclides to the atmosphere by ORNL facilities. To properly use any environmental transport model, some estimate of the model's predictive accuracy must be obtained. Because of a lack of sufficient data for the ORNL site, one year of weekly average ^{85}Kr concentrations observed at 13 stations located 30 to 150 km distant from an assumed-continuous point source at the Savannah River Plant, Aiken, South Carolina, have been used in a validation study of the atmospheric transport portion of AIRDOS-EPA. The predicted annual average concentration at each station exceed the observed value in every case. The overprediction factor ranged from 1.4 to 3.4 with an average value of 2.4. Based on a one-tailed student's t-test, we can be 98% confident that for this site under similar meteorological, release, and monitoring conditions no annual average air concentrations will be observed at the sampling stations in excess of those predicted by the code. As the averaging time of the prediction decreases, however, the uncertainty in the prediction increases.

34412 (CONF-830460—2) **Radon in homes and other technologically enhanced radioactivity.** Rundo, J.; Toohey, R.E. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83011731.

From Annual meeting of the National Council of Radiation Protection and Measurements; Washington, DC, USA (6 Apr 1983).

The results are described of recent observations at Argonne National Laboratory, contributing to our knowledge of such factors as the origin of high levels of radon in houses, its variability with time or otherwise, its uniformity throughout the house or otherwise, and the behavior and fate of the short-lived daughter-products. In a sample of 110 houses, mostly in the west suburban area of Chicago, 15% had radon concentrations in excess of 6 pCi litre^{-1} and 96% greater than 10 pCi litre $^{-1}$. If this distribution is representative of all houses in the USA, the population being exposed to such high concentrations of radon is far greater than the number of people in Grand Junction being exposed to quite similar concentrations from technologically enhanced radioactivity. There is a great need for far more extensive data on radon in houses.

34413 (DP-MS—82-79) **Representativeness of calculated peak and annual average concentrations.** Pendergast, M.M. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 13p. (CONF-830412—2). NTIS, PC A02/MF A01. Order Number DE83012031.

From 5. symposium on meteorological observations and instrumentation; Toronto, Canada (11 Apr 1983).

Portions are illegible in microfiche products.

Many environmental assessments are based upon meteorological calculations made with a version of the Gaussian plume model. Meteorological data are input to the model in the form of joint frequency distributions of wind direction, wind speed, and atmospheric stability. These models are referred to as wind-rose models and are used almost exclusively in many Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA) environmental assessments. An often used, but professionally abhorred practice, is to base environmental assessments of a site upon wind-rose data collected at a nearby site in comparable terrain and to assume that calculations will be representative. Criteria for representativeness can be arbitrarily established in response to specific NRC and EPA environmental regulations. A more realistic approach, however, is to account for the temporal or spatial variability of the data fields in the determination of these criteria. The purposes of this study were to: (1) evaluate the annual average and peak concentrations calculated with wind-rose models by using Krypton-85 as a tracer; (2) establish criteria for evaluating the representativeness of annual average and peak Krypton-85 air concentrations calculated from the use of wind-rose models; and (3) evaluate several factors that lead to the variability of calculated annual average and peak air concentrations. The data fields are the calculated annual-average and peak air concentration of Krypton-85 in the vicinity of the Savannah River Plant (SRP).

34414 (DP-MS—82-86) **Comparison of simulated to actual plutonium deposition at the Savannah River Plant.** Carlson, D.C.; Garrett, A.J.; Gay, D.D.; Murphy, C.E.; Pinder, J.E. III. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.; Savannah River Ecology Lab., Aiken, SC (USA)). 1982. Contract AC09-76SR00001. 13p. (CONF-821136—24). NTIS, PC A02/MF A01. Order Number DE83012126.

From 4. international conference on precipitation scavenging, dry deposition and resuspension; Santa Monica, CA, USA (29 Nov 1982).

Minute amounts of plutonium are released from the Savannah River Plant (SRP) separations facilities and deposited in the surrounding environs. Long-term deposition measurements show that contributions to offsite environmental plutonium by the SRP are negligible compared to fallout from weapons tests. The Savannah River Laboratory (SRL) recently developed a deposition model and compared its predictions to the observed plutonium deposition pattern. The model reproduced the observed range of deposition rates when full and truncated lognormal distributions of parti-

cle sizes were used to represent the emissions. Model predictions of total deposition out to 30 km were low by about a factor of two relative to estimates based on integrations of the empirical deposition curves. More measurements are planned, which should reduce uncertainties about model assumptions and the observed deposition rates.

34415 **(NUREG/CR—3016) Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks.** Ramsdell, J.V. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 49p. (PNL—4516). NTIS, PC A03/MF A01 - GPO $4.75. Order Number DE83011952.

Position C.2.b of Regulatory Guide 1.111 describes an approach to modeling the diffusion of effluents from roof top vents and short stacks using an elevated plume model under some conditions and using a ground-level source building wake model under other conditions. The approach is sometimes called a Split-H model. This report presents the results of an evaluation of the technical basis for and utility of the concept behind the Split-H model, outlines the devlopment of an upgraded model with those estimated using the Regulatory Guide Split-H model and a ground-level building wake model, and discusses alternatives to the Regulatory Guide position that the NRC may wish to consider. Concentration comparisons are made using model results for meteorological data from 18 nuclear power plant sites.

34416 **(PB—83-159665) Radon release from building material.** Pettersson, H.; Hildingson, O.; Samuelsson, C.; Hedvall, R. (Statens Provningsanstalt, Boraes (Sweden)). 1982. 59p. (SP-RAPP—1982:32). NTIS, PC A04/MF A01.

This report examines theory, measuring methodology, and measurement results for radon waste from road construction and building material. The effect of moisture and the quality of the surface layer and the concrete on release were also studied.

34417 **(PB—83-159798) Environmental radiation data: report 23-24. Report for July-December 1980.** (Environmental Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Facility). Apr 1981. 149p. (EPA—520/5-82-0111). NTIS, PC A07/MF A01.

Environmental Radiation Data (ERD) is compiled and published quarterly (five months after the quarter being monitored). The report includes data from the Environmental Radiation Ambient Monitoring System (ERAMS) and similar networks operated by contributing states. The ERAMS monitors environmental media for radioactive contaminants in air, precipitation, surface water, drinking water, and milk samples collected by state and local agencies throughout the United States. Specific radiochemical analyses include gross alpha, gross beta, gamma, tritium, 14C, 85Kr, 131I, 89-90Sr, 226Ra, 238-239Pu, and 234-235-238U. All data and associated 2 sigma counting errors are reported in standard units. Precision and accuracy of the data are ensured by duplicate analyses and participation in internal and external quality assurance programs.

34418 (PNL—4657, pp 7-11) **Atmospheric monitoring.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Radioactivity in air was measured by a network of continuously operating air samplers at nineteen locations near the Site perimeter and five locations somewhat distant from the Site. The Site perimeter samplers provided for general coverage in all directions but with emphasis in the prevalent downwind directions to the south and east of the Site including the communities of Benton City, Richland, Pasco, Connell, and Othello. The distant air sample locations provided background airborne radioactivity data for comparison. These samplers were located at Sunnyside, Moses Lake, Washtucna, Walla Walla, and at McNary Dam. Airborne radionuclide concentrations during 1982 were lower than those observed in 1981 because of the gradual decline of atmospheric fallout associated with a foreign atmospheric nuclear test that occurred in the fall of 1980. Airborne radioactivity data collected during 1982 did not indicate the presence of detectable levels of Hanford origin radionuclides in the offsite environs.

5005 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 33062

5006 Regulations

REFER ALSO TO CITATION(S) 33062, 33064, 33845, 34440

34419 (CONF-820418—, pp 102) **Environmental laws and regulations: potential changes.** Oakes, T.W. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

A review of the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Toxic Substances Control Act, and Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) will be given. Recent congressional records will be analyzed as an indication of trends in these areas. Discussion on directions of environmental programs wil be presented. A brief analysis of the potential effects on UCC-ND will be given.

34420 (CONF-820418—, pp 138) **Relaxation of SO_2 emission limits for the PGDP steam plant.** Shell, S.L. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Kentucky sulfur dioxide emission standards for the C-600 steam plant stacks are very stringent and necessitate the burning of very low sulfur (0.8%) coal to meet standards. Dispersion calculations of PGDP effluents indicated that SO_2 emissions have only a minor effect on ambient concentrations and that the plant's emissions are overregulated. A consultant was retained to explore the problem, and it appears that relief may be obtained by seeking a State Implementation Plan revision. This would allow the emission of more SO_2 from the coal-fired boilers within the applicable restrictions of National Ambient Air Quality Standards and the Prevention of Significant Deterioration regulation. The potential savings to the plant by burning higher sulfur coal could exceed $250,000 annually.

34421 **Nuclear energy - the Brazilian rules for the environment protection.** de Jesus Zerbini, E.C.G. Sao Paulo, Brazil; Companhia Energetica (1980). 4p. (In Portuguese). (CONF-8006246—2).

From Seminar on nuclear law; Rio de Janeiro, Brazil (9 Jun 1980).

The rules for the environment protection are mentioned in view of the possible damages caused by nuclear energy. The conventions signed by CNEN about the matter are also mentioned. (A.L.).

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5101 Basic Studies

34422 (ORNL—5999, pp 130-141) **Environmental resources.** Dyer, M.I. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The Environmental Resources Section performs research and analysis in three areas: modeling and systems analysis, environmetrics, and regional studies, including the work done on the Oak Ridge National Environmental Research Park (NERP). The modeling and systems analysis group worked on studies ranging from stochastic simulation of chaotic population models to the eradication of disease in epidemiological models. The group continued its interest in trophic relationships with a study of coevolution in a unique marine predator-prey system and a study of stability in evolving

food webs. The environmetrics group continued its emphasis on applied statistics, data management and computer science, and the integration of these tools into environmental research. Regional assessments have been completed on the Tennessee-Tombigbee Corridor and on potential conflicts between proposed energy facilities and critical natural areas. Using radiotransmitter equipment, the NERP staff has completed an intensive study of bobcat activity.

5102 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 33060, 33063, 34452

34423 (ORNL—5999, pp 142-157) **Terrestrial ecology.** Van Hook, R.I. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The Terrestrial Ecology Section is involved in basic and applied environmental research to support energy technology development and in gaining a better understanding of the structure and function of terrestrial ecosystems. The Section is organized around three basic areas of research (ecosystem studies, physiological studies, and environmental analyses); a major emphasis is on evaluating the ecological effects of air pollution on agricultural and natural systems. Research activities in bioclimatology continue to address reconstruction of past climatic changes through pollen analysis and tree-ring studies as a means of providing a sufficient data base from which to evaluate future climate changes and air pollution stress on forest and agricultural systems in the eastern United States. Forest ecology studies are concerned primarily with expanding succesion modeling capabilities and evaluating the impacts of management practices in terms of carbon metabolism and nutrient cycling. Forest-succession modeling currently is concerned with incorporating the fundamentals of nutrient cycling and water relations into our existing models. Air pollution studies continues as a major activity of the terrestrial section with emphasis on oxides of sulfur, ozone, trace elements, and acidic precipitation. Because of our ongoing activities, we are currently assisting the NPS in evaluating several air pollution issues in the Acadia, Buffalo Creek, and Great Smoky Mountains national parks.

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 33195, 33196, 33240, 33244, 33249, 33249, 33251, 34417

34424 (CONF-830460—1) **Role of environment.** Auerbach, S.I. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 18p. NTIS, PC A02/MF A01. Order Number DE83012038.

From Annual meeting of the National Council of Radiation Protection and Measurements; Washington, DC, USA (6 Apr 1983).

Portions are illegible in microfiche products.

Radiological assessments rely heavily on the use of mathematical models to predict the dose to man resulting from the environmental transport and subsequent human uptake of radionuclides released from nuclear activities. The paper discusses some problems in the use of these models based on the requirement that uptake and transfer coefficients for specific radionuclides and organisms be systematically determined in situ. Due to the lack of availability of these coefficients, reliance on generic default values causes uncertainties related to the variability of the environmental and experimental methodologies. (ACR)

34425 (INIS-mf—7605) **Radioactivity of different building materials. Proceedings of the 7. annual meeting of the OeSRAD held in Vienna, Austria, May 1981.** (Oesterreichischer Verband fuer Strahlenschutz (OeVS), Vienna. Studiengruppe fuer Radioaktivitaetsmessungen im Donauraum (OeSRAD)). 1982. 94p. (In German). (CONF-8105201—). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780517.

From 7. annual meeting of the OeSRAD on radioactivity of building materials; Vienna, Austria (1 May 1981).

Separate abstracts were prepared for papers in this report.

34426 (Juel-Spez—134) **Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil.** Schwarzer, K.; Thelen, J. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung). Nov 1981. 57p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750096.

The investigations show that in leakage incidents in tanks the essential parameters are the ground water velocity, the amount of leakage and the transversal dispersion coefficient. Among the inspected radionuclides Cs-137, Sr-90, Ru-106, Ce-144 and the unabsorbable H-3, Sr-90 represents the critical element. The reason is to be found in the low absorbing capacity of the sandy soil for this element and the long half-life of 28.5 a. But the results also prove that despite the unfavourable conditions or assumptions the migration of the radionuclides takes place so slowly that there would be enough time for taking appropriate countermeas res. Unfavourable conditions or assumptions to be mentioned are: sandy soil, due to high hydraulic permeability and low absorbing capacity; the delayed release of radionuclides off the solid phase during desorption process not being taken into account; high nuclide concentrations of the inspected HAW-solution. A constant Ksub(d)-value is obtained only after an according dilution of about 4 magnitudes. Provided that the consumption rate of drinking water is 400 l/a and assuming an extraction at 1000 m from the source at a ground water velocity of 0.01 m/d, the radiation exposure would be 1.2 x 10^{-7} rem/a for H-3 and approximately 0.15 rem/a (bone dose) for Sr-90.

34427 (PNL—4657, pp 25-29) **Foodstuffs.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Several types of foodstuffs, including milk, leafy vegetables, fruits, beef, chickens, eggs, wheat and alfalfa, were collected at several locations in the Hanford Site environs during 1982. All samples were analyzed for ^{90}Sr and ^{137}Cs. In addition, milk samples were analyzed for ^{131}I and fruit samples were analyzed for tritium. Samples were collected primarily from locations in the prevalent downwind directions from the Site, i.e., to the south and east of the Site. Samples were also collected in generally upwind directions somewhat distant from the Site to provide information on radioactivity levels in the various products that could be attributed to worldwide fallout. Foodstuffs collected in the Riverview Area were grown using Columbia River water and thus provide information regarding potential radionuclide concentrations attributable to radionuclides in the river. Samples collected during 1982, as in recent previous years, indicated no apparent Hanford contribution to radioactivity levels in locally produced foodstuffs. Tritium, ^{90}Sr and ^{137}Cs were found to be present in a number of the samples; however, the concentrations observed in samples collected near the Hanford Site were similar to levels observed in samples collected away from the Site.

34428 (PNL—4657, pp 31-35) **Wildlife.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

The Hanford Site serves a refuge for migratory waterfowl, upland game birds, and a variety of mammals. These wildlife have unrestricted access to several areas near site facilities (primarily waste-water ponds) that contain low levels of radionuclides attributable to site operations. Sampling is performed routinely in the vicinity of operating areas where the highest potential exists for uptake of radionuclides by wildlife. The number of animals that visit these areas is small compared to the total population in the area, and, as a result, human consumption of an animal from one of the sampling locations is unlikely. Nevertheless, these samples help provide an estimate of the maximum potential dose impact if onsite game were consumed. Fish sampling is also performed routinely along the Hanford reach of the Columbia River. Results provide an indication of the average radionuclide concentrations attributable to Hanford in local fish so that the potential dose impact to humans for this pathway can be evaluated. Analytical results of terrestrial wildlife samples collected during 1981 were very similar to those

observed in recent previous years. Samples of fish collected from the Columbia River along the Hanford Site showed no discernible difference in radionuclide concentration compared to samples collected upstream of the Site. The dose that would be received by a person following consumption of any of the sampled species at the maximum radionuclide concentration observed in 1982 would be well within the applicable DOE dose standards.

34429 (PNL—4657, pp 37-40) **Soil and vegetation.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Contributions from Hanford operations to background levels of radionuclides are determined by comparing the results of samples collected in prevalent downwind locations, primarily to the south and east of the Site, with samples collected from distant or generally upwind directions. Based on routine samples collected during 1982, there was no indication of a detectable contribution from Hanford to radionuclide concentrations in soil and vegetation in the offsite environment. Although no difference could be discerned based on the routine samples collected in 1982, a special study involving the collection of a large number of soil samples showed that concentrations of uranium in surface soils east of the Columbia River near the 300 Area were slightly higher than concentrations normally observed at several offsite sampling locations west of the river. The study, however, did not provide conclusive evidence regarding the reason for the difference. Although the possibility of a 300 Area source must be considered, the observed uranium concentrations were all within the range of concentrations normally found in soils in eastern Washington. Additional samples will be collected in 1983 to determine the naturally occurring uranium concentrations in soils on the east bank of the Columbia River.

34430 (PNL—4657, pp 41-46) **Penetrating radiation.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Dose rates from penetrating radiations (primarily gamma-rays) were measured at a number of locations in the Hanford environs during 1982. The measurements were made using thermoluminescent dosimeters (TLDs) to provide estimates of the dose rates from external radiation sources. Naturally occurring sources, including radiations of cosmic origin and natural radioactive materials in the air and ground as well as fallout from the atmospheric testing of nuclear weapons, result in the measurement of a certain amount of penetrating radiation at all dosimeter locations (NCRP 1975). Increases in the measured dose rates above these background levels could be the result of the dosimeter to radioactive materials associated with activities at Hanford. Dose rate measurements at locations in the vicinity of residential areas during 1982 were similar to those observed in previous years since external dose rate monitoring with TLDs began in 1970. Measurements made near operating areas and along the Columbia River indicated several locations where dose rates were somewhat higher than background levels. The highest measured dose rate in a publicly accessible location was observed at the 300 Area's west fence and averaged 0.3 mrem/h during 1982.

34431 (PNL—4657, pp 47-52) **Radiological impact of Hanford operations.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

An assessment of potential radiological impact indicated that radiation doses to the public attributable to 1982 operations at Hanford were well below all applicable regulatory limits and were significantly less than dose potentially received from some other common sources of radiation. The fifty-year whole body cumulative dose potentially received by an assumed exposed individual was calculated to be 0.7 mrem, as compared to the DOE Radiation Protection Standard of 500 mrem. The fifty-year whole body cumulative dose to the surrounding population was calculated to be 4 man-rem. These doses can be compared to the approximate 100 mrem and 34,000 man-rem doses received annually by an average individual and the surrounding population, respectively, as a result of naturally occurring radiations in our environment. An assessment of potential radiation doses due to residual radionucildes from past Hanford operations also revealed no significant impacts on the public.

5105 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 33243, 33308

34432 **(N—8230585) Survey of spatial data needs and land use forecasting methods in the electric utility industry. Final Report.** (Environmental Systems Research Inst., Redlands, CA (USA)). Apr 1981. 346p. (NASA-CR—166372). NTIS, PC A15/MF A01.

A representative sample of the electric utility industry in the United States was surveyed to determine industry need for spatial data (specifically LANDSAT and other remotely sensed data) and the methods used by the industry to forecast land use changes and future energy demand. Information was acquired through interviews, written questionnaires, and reports (both published and internal).

34433 **(NUREG/CR—3173) New Madrid seismotectonic study. Summary of activities from 1977 through 1981.** Buschbach, T.C. (Saint Louis Univ., MO (USA)). Mar 1983. 210p. NTIS, PC A10/MF A01 - GPO $7.00. Order Number DE83901749.

Portions are illegible in microfiche products.

This report summarizes a five year coordinated program of geological, geophysical, seismological studies in the New Madrid area. The program was designed to define the structural setting and tectonic history of the area in order to realistically evaluate earthquake risks in the siting of nuclear facilities. Interpretation of gravity, magnetic, and seismic reflection investigations in the New Madrid area indicate a spatial correspondence of the seismic activity to an ancient rift. Regional studies show that this rift extends to the southwest and to the northeast where it becomes part of a much more extensive rift complex. Two models have been proposed to account for the interpreted structure and seismicity in the New Madrid area. One model suggests that the ancient rift is a zone of weakness in the crust along which regional, largely horizontal, stresses are relieved. Presumably this has occurred repeatedly throughout the Phanerozoic. Another model has the rift being reactivated by local, largely vertically-derived forces which are derived from a thermal perturbation within the upper mantle. Field studies, drill holes, trenching, seismic surveys, and detailed gravity studies have shown that only small-scale or no movements have occurred along any of the faults studied since the beginning of Quaternary time. However, studies of the geomorphology of the area suggest that minor amounts of warping have occurred in parts of the region since the Pleistocene terraces were formed. Also, faults with displacements of up to 3 meters, folds, and sandblows were identified in a trench excavated across the Tiptonville (Reelfoot) scarp in northwestern Tennessee.

34434 **(PB—83-133918) Erosion potential of reclaimed agricultural lands in Perry County. Final report.** (Greater Egypt Regional Planning and Development Commission, Carbondale, IL (USA)). Jul 1982. 74p. NTIS, PC A04/MF A01.

Thirteen hundred acres of land reclaimed by four coal mining companies to row crop capability were assigned soil loss estimates using the Universal Soil Loss Equation. On-site measurements were made. Some areas were in crop production. Tables were prepared to show which of nine hypothetical crop rotation/tillage method combinations would bring each of the 44 acres studied into compliance with Perry County, Illinois erosion control standards for 1995. The report concluded that sediment and erosion control within tolerance limits for reclaimed soils are achievable using common management practices.

34435 **(PNL—4657) Environmental surveillance at Hanford for CY 1982.** Sula, M.J.; Carlile, J.M.V.; Price, K.R.; McCormack, W.D. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 86p. NTIS, PC A05/MF A01. Order Number DE83011777.

Separate entries are processed for individual projects. (PSB)

34436 **(TRITA-KUT—1025) Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia.** Jergman, K. (Tekniska Hoegskolan Stockholm (Sweden). Inst. fuer Kulturteknik). 1981. 225p. (In Swedish). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83750465.

Portions are illegible in microfiche products; Thesis.

In the arid climate zone, where the potential evaporation is much higher than the precipitation, soil and water generally are enriched by salts. In this research project it has been pointed out how salts affect engineering geology in different ways. The extensive study of the Al Khafji area in Saudi Arabia has shown that salts have affected soil and water so that - the crust hardness has increased due to a development of duricrust. The strength of the upper part of the crust is similar to weak rock. - the coastal terrace area moves vertically - groundwater affects the salinization of the soil profile A general description of the effect of salts on engineering geology can be summarized as below: The precipitated salts affect the profile so that 1.Stability changes. 2.Swelling alternatively contraction can occur due to variations of the water content. 3.Vegetation growth becomes difficult or impossible. 4.Excavation work is difficult. 5.Aggregate sources are affected. 6.Concrete corrosion is caused. 7.There is demand for proper field and laboratory tests and for special design criteria.The occurance of salts in the water causes due special conditions that 1.The soil profile is enriched by salts 2. The plants are damaged. 3.Concrete corrosion is developed. 4.The water is not suitable for drinking or irrigation purposes. 5. The density increases to such an extent that it effects the direction of the groundwater flow.

34437 **Criconematina (nematoda: tylenchida) from the Aleutian Islands.** Bernard, E.C. (Univ. of Tennessee, Knoxville). *Journal of Nematology;* **14**: No. 3, 323-331(1982).

A new genus (Cerchnotocriconema) and three new species (C. psephinum, Hemicycliophora anchitkaensis, and Paratylenchus amundseni) are described from Adak and Amchitka Islands in the Aleutian chain. The new genus differs from all other criconematid genera in having irregular, convex sculpturing consisting of small, oval plates on the anterior and posterior regions of each annule, with the mid-annular region minutely punctate or dentate. H. amchitkaensis n. sp. resembles H. sinilis Thorne and H. zuckermani Brzeski, but has only one head annule, instead of two. P. amundseni n. sp., which has a stylet 17 to 19 μm long, is similar to P. tatea Wu and Townsend and P. labiosus Anderson and Kimpinski, but differs by the presence of males and the possession of conoid-truncate lip region, functional spermatheca, and long male tail (c = 8.5 to 9.5). Seriespinula seymouri Wu (Mehta and Raski), Nothocriconema longulum (Gunhold) De Grisse and Loof, and Macroposthonia xenoplax (Raski) De Grisse and Loof are also reported from the islands.

34438 **Three new species of heteroderoidea (nematoda) from the Aleutian Islands.** Bernard, E.C. (Univ. of Tennessee, Knoxville). *Journal of Nematology;* **13**: No. 4, 499-513(Oct 1981).

Three new species of Heteroderoidea are described from Adak and Amchitka Islands in the Aleutian chain. Second-stage juveniles of Thecavermiculatus crassicrustata, n. sp., differ from those of T. gracililancea Robbins by having longer stylets (40 to 50 μm vs 19 to 22 μm). The female of T. crassicrustata has a longer neck, a more posterior excretory pore, and lacks a posterior protuberance. Meloidodera eurytyla, n. sp., differs from other Meloidodera spp. in that second-stage juveniles have longer stylets (32 to 35 μm) and much more massive styletknobs, while males have a longitudinally striated basal head annule. Meloidogyne subarctica, n. sp., can be separated from other Meloidogyne spp. by combinations of the following characteristics: perineal pattern with large oval areas in the tail region devoid of striae, arch with few unbroken striae; female excretory pore 1.5 to 2.5 x the stylet length from the anterior end; haploid chromosome number = 18; the spermatheca filled with sperm; stylet length of second-stage juveniles 13.5 to 15.4 μm.

5106 Regulations

REFER ALSO TO CITATION(S) 34419

34439 **(AD-A—121329/7) PCB compliance, assessment, and spill control guide.** (Naval Energy and Environmental Support Activity, Port Hueneme, CA (USA)). Aug 1982. 105p. NTIS, PC A06/MF A01.

Polychlorinated biphenyls (PCB) are toxic belonging to the well-known chlorinated hydrocarbon family. Because of their low flammability and high stability, PCBs have been extensively used as coolants and insulators in electrical equipment. However, due to the known environmental and health problems occurring from improper use and handling, the Environmental Protection Agency has promulgated stringent regulatory controls concerning use, storage, transport and disposal of PCBs leading to a total ban on use of PCBs. This guide was designed to assist Navy activities in complying with these complex and intricate regulations.

34440 **(DP-MS—82-52) Environmental protection analysis and planning for proposed Savannah River Plant actions.** Crawford, T.V.; Tseng, J.C. (Du Pont de Nemours (E.I) and Co., Aiken, SC (USA). Savannah River Lab.; Department of Energy, Aiken, SC (USA). Savannah River Operations Office). 1982. Contract AC09-76SR00001. 8p. (CONF-821215—19). NTIS, PC A02/MF A01. Order Number DE83011271.

From DOE environmental protection information meeting; Denver, CO, USA (7 Dec 1982).

The National Environmental Policy Act (NEPA), Council on Environmental Quality Regulations Implementing NEPA (40 CFR 1500 to 1508); and the DOE Environmental Compliance Guide (DOE/EE-0132) require the early consideration of environmental factors for all proposed federal actions. This paper presents a system which has been implemented at the Savannah River Plant (SRP) for facilitating NEPA considerations for a wide variety of activities.

52 ENVIRONMENTAL SCIENCES, AQUATIC

5201 Basic Studies

REFER ALSO TO CITATION(S) 33156, 34468, 34507

34441 **(GSF-R—268) Institute for Radiohydrometry - annual report 1980.** (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Radiohydrometrie). Aug 1981. 264p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83750104.

Ground water flow models are simulated by means of loose rocks, paving stones or sheet steel constructions, and the physical characteristic values of the soil are among other things determined by means of hydrological tracers. The ferrestrial tests comprise single-borehole methods, marking tests, isotope-hydrological investigations as well as hydrological investigations at the Asse and on glaciers.

34442 **Phytoplankton contribution to alkaline phosphatase activity.** Stewart, A.J. (Oak Ridge National Lab., TN); Wetzel, R.G. *Archiv fuer Hydrobiologie;* **93**: No. 3, 265-271(Feb 1982). Contract AC02-76EV01599.

A centrifugation procedure was used to partition alkaline phosphatase activity (APA) and assimilated carbon (^{14}C) in phytoplankton from four Michigan lakes. In all cases, although assimilated carbon partitioned nearly quantitatively, APA did not. The partitioning disparity was used to compute APA contributions by phytoplankton, nonalgal particulate matter and dissolved enzyme. Maximum possible algal contribution to total AP was consistently < 34 percent, and in some cases was as low as 5 to 6 percent. Nonalgal particulate APA typically comprised 15 to 73 percent of the total APA. Filtration techniques commonly used the assess algal

contibution to APA may seriously overestimate the quantity of APA directly affiliated with algal cells.

34443 **UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake.** Francko, D.A. (Oklahoma State Univ., Stillwater); Heath, R.T. *Limnology and Oceanography;* **27**: No. 3, 564-569(1982). Contract AC02-76EV01599.

The concentration of UV-sensitive complex phosphorus compounds in water from an acid bog lake was linearly related to the concentration of dissolved high molecular weight humic material (DHM) both seasonally and diurnally. The first-order rate of photoreduction (Fe^{3+} to Fe^{2+}) of DHM iron equaled the rate of release of orthophosphate (SRP) from these compounds. The rate of photoreduction of DHM iron was the same as the rate of photoreduction of ferric citrate under similar conditions. Reduced DHM iron was auto-oxidizable (Fe^{2+} to Fe^{3+}); ferrous citrate was not. These data support the view that orthophosphate sorbed to ferric iron DHM complexes may be released by a mechanism involving UV-induced photoreduction of ferric iron to the ferrous state.

34444 **Evidence for upstream dispersion of adult caddisflies (trichoptera: hydrosychidae) in the Columbia River.** Coutant, C.C. (Oak Ridge National Lab., TN). *Aquatic Insects;* **4**: No. 2, 61-66(1982).

The radioisotope ^{65}Zn, introduced to the Columbia River in discharges of the US Atomic Energy Commission's Hanford reactors, was used to test the hypothesis that adult caddis flies migrate upstream after emerging from the aquatic environment. The larval stages living downstream of the effluents are known to accumulate appreciable levels of ^{65}Zn. The radioisotope was found in levels above background in shoreline swarms of adult caddis flies as far as 16 km above the uppermost reactor effluent. Whether movement was only upstream and the precise distances flown remain unclear. The upstream movement is important for understanding the biology of riverine aquatic insects and for evaluating the upstream dispersal of radioactive contaminants.

34445 **Isolation of cyclic adenosine 3':5'-monophosphate (cAMP) from lakes of differing trophic status: Correlation with planktonic metabolic variables.** Francko, D.A.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Limnology and Oceanography;* **27**: No. 1, 27-38(1982).

The seasonal dynamics of particulate and dissolved cyclic adenosine 3':5'-monophosphate (cAMP) were examined in the epilimnia and littoral zones of two trophically dissimilar lakes. Each cAMP fraction was found in quantities comparable to those reported for cultured phytoplankton species. Both cAMP fractions varied greatly in concentration during the season and between the oligotrophic and hypereutrophic lakes. Increases in phytoplankton community densities were paralleled by weight-specific changes in particulate cAMP levels, depending on the phytoplankton species present. A linear relationship between cellular cAMP levels and in situ primary productivity rates was found in the oligotrophic lake. In both lakes, certain phytoplanktonic associations had particulate cAMP levels linearly related to chlorophyll a content and specific activity of alkaline phosphatase.

34446 **Dissolved humic materials: photodegradation, sediment effects, and reactivity with phosphate and calcium carbonate precipitation.** Stewart, A.J. (Oak Ridge National Lab., TN); Wetzel, R.G. *Archiv fuer Hydrobiologie;* **92**: No. 3, 265-286(Oct 1981). Contract AC02-76EV01599.

Dissolved humic materials (DHM) are often important constituents of the dissolved organic carbon (DOC) pool in lakes, but little is known about environmental factors that regulate DHM quality and quantity, or of the ecological importance of DHM in pelagial environments. Consequently, a number of experiments were undertaken to determine the relative importance of sediment/pH and of photolysis in regulating the quality and quantity of DHM in a small, hardwater lake. In addition, since DHM may affect pelagial primary producers by interacting wtih reactive nutrients, we examined certain relationships between DHM and orthophosphate, and between DHM and the process of $CaCO_3$ precipitation and phosphate coprecipitation. Sediment/pH conditions markedly influenced the spectral characteristics and apparent molecular weight spectra of DHM. Field and laboratory data indicated that organic-rich sediment selectively absorbs DHM of high apparent molecular weight leaching from scenescing littoral vegetation during rain events, and slowly releases DHM of lower apparent molecular weight between rain events. Sunlight or high-intensity UV light was sufficient to cause rapid (< 300 min) alteration in the spectral characteristics of DHM, and solar radiation is likely important in seasonal regulation of DHM quality in shallow waters and in the upper photic zone in pelagial areas. Low concentrations (< 2 mg l^{-1}) of fulvic material were found to be potent inhibitors of the $CaCO_3$ precipitation process under natural conditions, but did not significantly alter short-term (0 to 3 days) rates of ^{14}C assimilation by natural algal assemblages. Binding of orthophosphate to DHM could not be demonstrated under conditions similar to those in the epilimnion of the study site, but may be an important regulator of phosphate in systems of lower alkalinity.

34447 **Longterm dissolved and particulate alkaline phosphatase activity in a hardwater lake in relation to lake stability and phosphorus enrichments.** Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Verhandlungen - Internationale Vereinigung fuer Theoretische und Angewandte Limnologie;* **21**: 369-381(Jul 1981). Contract AC02-76EV01599.

Particulate and dissolved alkaline phosphatase activities (PO_4-ase) were determined biweekly at 1 m depth intervals for over 6 years in an oligotrophic, hardwater lake of southwestern Michigan. PO_4-ase activities were low during autumnal circulation and winter stratification. PO_4-ase of the spring period varied markedly from year to year, and was inversely related to lake stability and the extent of spring circulation. Birgean work and Schmidt stability computations demonstrated the acute effects of restricted circulation periods in certain years on subsequent metabolic activities in the epilimnion. Extremely high PO_4-ase occurred in the phytoplankton during spring and summer periods of years of temporary spring meromixis or partial circulation. During mid-summer stratification, high PO_4-ase coincided with periods of reduced productivity in the epilimnion, reduced diatom development, and massive epilimnetic decalcification and co-precipitation of P with $CaCO_3$. During mid-summer a non-N_2-fixing cyanophyte and chlorophyte flora commonly developed in the metalimnion. Experiments with epi- (2m) and metalimnetic (6m) phytoplankton were conducted for an annual period. Reductions in PO_4-ase and enhancement of C-uptake and chlorophyll concentrations occurred following enrichment with inorganic P, and to a lesser extent with organic P. Epilimnetic phytoplankton responded more strongly to P than did metalimnetic phytoplankton, and P limitation was most acute in early and mid-summer.

34448 **Asymmetrical relationships between absorbance, fluorescence, and dissolved organic carbon.** Stewart, A.J.; Wetzl, R.G. (Michigan State Univ., Hickory Corners). *Limnology and Oceanography;* **26**: No. 3, 590-597(1981).

Relationships between ultraviolet absorbance, fluorescence, and concentrations of dissolved organic carbon (DOC) were examined in four model materials fractionated by gel permeation chromatography. Fluorescence was consistently a poor predictor of DOC concentration, and absorbance correctly predicted DOC concentration only in the more labile materials. Asymmetry between DOC and the two optical parameters was related to the apparent molecular weight of the dissolved organic matter (DOM) and could be explained by greater levels of internal quenching and shielding in compounds of larger apparent molecular weight. A lake-to-lake comparison (n = 55) showed a calcium-related selective loss of high molecular weight humic materials, which invalidates the use of either optical characteristic as a good predictor of DOC concentration in hard-water systems. Calcium-related seasonal and between-lake differences in the relative molecular weight of the DOM may selectively alter trace metal availability.

5202 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 33060, 33067, 33068, 33069, 33149, 33150, 33151, 33153, 33155, 33156, 34092, 34254, 34400, 34588, 34677

34449 (CONF-820418—) **1982 UCC-ND/GAT environmental protection seminar: proceedings.** (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 540p. NTIS, PC A23/MF A01. Order Number DE83010817.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This environmental protection seminar was divided into seven sessions: (1) general environmental protection, (2) air and water pollution control, (3) spill control and countermeasures, (4) toxic materials control, (5) hazardous materials control, (6) environmental protection projects, and (7) cost benefit analysis. Separate abstracts have been prepared for the 41 papers presented therein. (ACR)

34450 (CONF-820418—, pp 210-219) **Prediction of long-term impact of PGDP chromate sludge lagoon discharge.** Baker, C.L. (Paducah Gaseous Diffusion Plant, KY). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

An increased interest in non-chromate based corrosion inhibition systems has been fostered by EPA guidelines governing the disposal of chromium contaminated wastes. Several of the more promising non-chromate systems are being evaluated at K-25. Significance differences exist in the chromated water treatment systems used at the three diffusion plants. An area of common concern has been the long-term oxidation of trivalent chromium present in the respective sludge lagoons. Studies were initiated at Paducah to determine the discharge rate for the C-616 Sludge Lagoon, the hexavalent chromium concentration in the discharge of the sludge lagoon, the chemistry of trivalent chromium oxidation under sludge lagoon conditions, and the impact of the hexavalent chromium in the sludge lagoon discharge on the full flow lagoon. Flow diagrams showing the basic differences in the chromate treatment systems at the diffusion plants are included.

34451 (CONF-820418—, pp 315-320) **Reclamation and disposal of water-based machining coolants.** Taylor, P.A. (Oak Ridge Y-12 Plant, TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

The Oak Ridge Y-12 Plant, currently uses about 10^6 L/yr (260,000 gal/yr) of water-based coolants in its machining operations. These coolants are disposed of in a 110,000-L (29,000-gal) activated sludge reactor. The reactor has oxidized an average of 38.6 kg of total organic carbon (TOC) per day with an overall efficiency of 90%. The predominant bacteria in the reactor have been identified once each year for the past three years. Six primary types of water-based coolants are currently used in the machine shops. In order to reduce the coolant usage rate, efforts are being made to introduce one universal coolant into the shops. By using a biocide to limit bacterial deterioration and using a filter and centrifuge system to remove dirt and tramp oils from the coolant, the coolant discard rate can be greatly reduced.

34452 (ORNL—5999, pp 1-15) **Advanced fossil energy program.** Gehrs, C.W. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

Advanced Fossil Energy Program research activities are presented. A study was completed to identify (1) vegetation potentially at risk from the additive atmospheric contributions of advanced technologies and (2) sites to be used to verify findings of field research studies. Aquatic research produced initial models of transport, fate, and effects of released coal liquid products. Other topics include solid waste management, synfuel wastewater sludges, and H-coal data management. (KRM)

34453 (ORNL—5999, pp 16-30) **Toxic substances program.** Bondietti, E.A. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

Research in ecotoxicology is under way for the US Environmental Protection Agency (EPA) Office of Toxic Substances, and several test protocols recommended for development are now under experimental evaluation. The Organization for Economic Cooperation and Development (OECD) single-species test protocols are also being evaluated before their incorporation into EPA's chemical assessment scheme. A multimedia modeling project is expanding the Oak Ridge National Laboratory (ORNL) Unified Transport Model to include toxic substances (organics). This model, UTM-TOX, will assist EPA in evaluating chemical dispersion and potentials as part of a chemical assessment. Also, an evaluation of water quality models for EPA was undertaken this past year. Research for the US Department of Energy (DOE) on radionuclides in the environment is one of the major concerns of the Toxic Substances Program. This past year was devoted, in part, to initiating a radionuclide assessment model validation program; continuing Pu, Am, Cm and U work on Pond 3513; and completing our terrestrial Tc work. Because of the increased applications of high-resolution gamma spectroscopy to ^{210}Pb detection, an expansion of research relating to natural radionuclides has occurred.

34454 (ORNL—5999, pp 104-118) **Aquatic ecology section.** Van Winkle, W. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

Streams, rivers, and reservoirs are the predominant aquatic ecosystems throughout the southern United States, and stream and reservoir ecosystem studies continue to be a major emphasis in the section. Several lines of ecosystem-oriented research on streams and river-reservoir systems that were emphasized during the past year are described. The first three summaries describe investigations in progress on materials cycling and transport in lower-order streams. The next two report our progress in developing a conceptual basis for examining man-made impoundments (i.e., reservoirs) as ecological systems and investigating the determinants of biological productivity and ecosystem structure in individual reservoirs and reservoir series. Finally, some proposed initiatives in stream and reservoir research that focus on an issue of international concern, the ecological effects of acidic deposition are summarized.

34455 (PB—83-132811) **Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report.** (National Academy of Sciences - National Research Council, Washington, DC (USA)). 1981. 260p. NTIS, PC A12/MF A01.

The eleven working papers in this volume were prepared for the study of the Committee to Review Methods for Ecotoxicology. The charge to the Committee was to identify characteristics of ecological systems that would indicate hazardous effects of chemicals beyond the level of single species, to establish criteria for suitable testing schemes, and to evaluate the effectiveness of available test systems in assessing effects of chemicals within ecosystems. To assist in its deliberations on the broad range of issues to be addressed, the Committee sought additional input from a number of experts. The working papers address a variety of topics: the use of microcosms as a testing scheme in terrestrial and aquatic systems; lethal gene distribution and diatoms as monitoring techniques for hazard assessment in wetlands and watersheds; approaches to assessing the environmental impact of radionuclide and xenobiotic organic substances; a general review of ecosystem properties relevant to ecotoxicology; and a discussion of the advantages and disadvantages of various of ecological tests.

34456 (PNL—4657, pp 19-21) **Columbia River water quality monitoring.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Waste water from Hanford activities is discharged at eight points along the Hanford reach of the Columbia River. These discharges consist of backwash water from water intake screens, cooling water, river bank springs, water storage tank overflow, and fish laboratory waste water. Each discharge point is identified in an existing National Pollutant Discharge Elimination System (NPDES)

permit issued by the EPA. Effluents from each of these outfalls are routinely monitored and reported by the operating contractors as required by their NPDES permits. Measurements of several Columbia River water quality parameters were conducted routinely during 1982 both upstream and downstream of the Hanford Site to monitor any effects on the river that may be attributable to Hanford discharges and to determine compliance with the Class A designation requirements. The measurements indicated that Hanford operations had a minimal, if any, impact on the quality of the Columbia River water.

34457 **Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity.** Francko, D.A.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Journal of Freshwater Ecology;* 1: No. 4, 365-371(Apr 1982). Contract AC02-76EV01599.

Daphnia pulex, a common cladoceran zooplankton species, contains tissue cAMP concentrations similar to those found in algae, bacteria, and aquatic macrophytes. Daphnia release significant quantities of cAMP into the extracellular medium. Release of algal cellular cAMP as a result of digestive degradation of algal cells may also be an important source of dissolved cAMP in lakewater.

5203 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 33189, 33190, 33198, 33199, 33203, 33217, 33224, 33236, 33241, 33242, 33245, 33249, 33251, 33253, 33254, 33255, 34417, 34424, 34430, 34453, 34455

34458 (PNL—4657, pp 13-17) **Columbia River radiological monitoring.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

Since the Columbia River is used for drinking water and crop irrigation, as well as fishing, hunting, and other recreational activities, it continues to be closely monitored for radionuclides potentially of Hanford origin. The levels of radionuclides in the river attributable to Hanford activities, past or present, are determined by comparing radionuclide concentrations in samples collected upstream of the Site with samples collected downstream.

34459 (PNL—4657, pp 23-24) **Ground water.** May 1983. NTIS, PC A05/MF A01.

In Environmental surveillance at Hanford for CY 1982.

The Hanford ground water is sampled at a large number of locations on the Site, and results of the sampling program are provided in an annual report Ground-Water Surveillance at the Hanford Site for CY-1982. Results of ground-water monitoring for 1982 (Eddy, Prater and Rieger 1983) show that water discharged to the ground in the 200 Areas has gradually migrated to the Columbia River and that ^{3}H and other mobile contaminants are entering the river. The overall effect of the ground-water contribution to currently existing radionuclide concentrations is small as discussed in the Columbia River Radiological Monitoring section.

5205 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 34436

5206 Regulations

REFER ALSO TO CITATION(S) 34419, 34440

53 ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

5301 Social And Economic Studies

REFER ALSO TO CITATION(S) 33799

34460 **Model energy audit procedure for the RCS program.** Johnson, D.R. (Oak Ridge National Lab., TN); Olsen, K.O. pp 542-566 of Energy in the man-built environment. New York, NY; American Society of Chemical Engineers (1981). Contract W-7405-ENG-26.

From Energy in the man-built environment; Vail, CO, USA (3 Aug 1981).

A Model Energy Audit procedure was developed for the US Department of Energy Residential Conservation Service (RCS) Program. The program requires that large gas and electric utilities offer on-site energy audits to their residential customers. The auditor must inspect the residence, calculate cost and saving estimates for region-specific conservation and renewable resource energy-saving measures, and present the estimates to the customer on site and in person. The measures include shell and furnace modifications, active and passive solar measures, and small wind machines.

5302 Assessment Of Energy Technologies

REFER ALSO TO CITATION(S) 33802

34461 (CONF-820418—, pp 469) **Cost/benefit analysis: environmental protection projects.** Oakes, T.W. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

A review of cost/benefit analysis techniques and determinations of applications to environmental protection projects will be given. Incorporated in this discussion will be techniques for risk assessments which include the risk of not doing a project versus doing a project. In the cost benefit approach, capital and operating cost will be included on the cost side. Cost savings, reduction in environmental impact, recovery of valuable constituents, public perception, and corrections of noncompliances will be on the benefit side. Flow diagrams of the various steps in this type of analysis will be presented.

34462 **(INIS-mf—7399) Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens.** Nikoopour-Deylami, A.H. (Technische Univ., Graz (Austria)). Nov 1981. 112p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780481.

Thesis.

In the first part of the thesis, the adsorption of radioiodine and methyliodide on different kinds of active charcoal was studied. It was observed that untreated charcoal retains radioiodine sufficiently, while organic compounds as methyliodid could be adsorbed after pretreating with triethylenediamine even at high air velocities. In the presence of moisture in the air the efficiency dropped down to 30% of the original value. In the second part of the work an apparatus using sandfilter columns for the separation of toxic substances and thermochrome column for marking the temperature intervals was developed and posted at different places in athe filtering system of an incineration plant. After extraction of the polycyclic aromates with benzene from the column and chemical separation, the neutral fraction was split by a silicagel column and 14 toxic aromates identified by gas chromatography. It could be proven that 97 +- 2% of the polycyclic aromates were retained by the existing ceramic filter systems.

34463 **(INIS-mf—7416) Numerical calculation of three-dimensional long-time temperature fields using a special finite element method: the final storage of highly radioactive waste in salt rocks.** Ploumen, P. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 12 Jun 1980. 148p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780482.

Thesis.

In the present case the spatial discretisation shows some differences compared with the current Galerkin method. The time discretisation is accomplished by the trapezoid rule. The systems of equations are linearized by the Newton-Raphson method and

solved by iteration using the procedure of successive overrelaxation. The realiability of the numerical results has been tested for the present application of heating of salt rocks by radioactive thermal sources.

34464 **(INIS-mf—7440) Business report 1980 of the HKG.** (Hochtemperatur-Kernkraftwerk G.m.b.H. (HKG), Uentrop (Germany, F.R.)). 1981. 24p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780472.

The business report 1980 reviews among other things the state of the construction works, of the fuel element fabrication, of the licensing procedures, as well as the costs, the financing and the participations in the THTR.

34465 **(INIS-mf—7442) Hierarchically structured identification and classification method for vibration control of reactor components.** Saedtler, E. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 23 Jan 1981. 264p. (In German). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83780469.

Thesis.

The method for controlling the vibrating behaviour of primary circuit components or for a general systems control is a combination of methods of the statistic systems theory, optimum filter theory, statistic decision theory and of the pattern recognition method. It is appropriate for automatic control of complex systems and stochastic events.

34466 **(INIS-mf—7443) Report on the 18th business year 1981.** (Kernkraftwerk Lingen G.m.b.H., Darme/Lingen (Germany, F.R.)). 1982. 20p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780471.

The VEW AG, Dortmund, decided on the definite shutdown of this nuclear power plant. Their future tasks are to prepare and perform the safe enclosure and the later demolition of the plant as well as the reprocessing of the spent nuclear fuel.

34467 **(INIS-mf—7445) Interim storage of spent fuel elements in transport containers in the yard of the nuclear power plant Wuergassen.** (Preussische Elektrizitaets-A.G. (Preussenelektra), Hannover (Germany, F.R.)). Mar 1980. 21p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780470.

Microfiche only, copy does not permit paper copy reproduction. ed.

Site and structural design of the storage hall, description of the CASTOR Ic-container for dry storage, and considerations on safety aspectsare discussed.

34468 **(INIS-mf—7458) Routine apparatus for marine ^{85}Kr-samples.** Koch, T. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftliche Gesamtfakultaet). 1981. 92p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780478.

Thesis.

Permanent gas samples are extracted with a degasing system and, after separation of the N_2, O_2, and CO_2 components, the Kr-concentration is determined by gas chromatography. With a proportional chamber set-up in circular configuration, the ^{85}Kr yield of the sample in measured. The measuring time amounts to about 5 hours. With this short measuring time ^{85}Kr can be used as an oceanographic tracer with adequate throughput and accuracy for routine operation.

34469 **(INIS-mf—7462) Studies for the layout and technical conception of a two-circuit HTR power plant of 600 MWsub(el) under public utilizer aspects.** Schuetten, R. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 19 Jan 1981. 150p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780473.

Thesis.

In this study concerning conceptions for a nuclear power plant of 600 MWsub(el), with a high-temperature reactor a conception for a HTR-nuclear power plant of 600 MWsub(el) to be built in the Federal Republic of Germany iss developed on the basis of operating experience with the 15-MW-AVR-experimental nuclear power plant. The construction of the THTR-300 nuclear power plant and the gas-cooled reactors of English, French and American origin. This report gives a survey of the most important findings and the requirements on behalf of the public utilities for a nuclear power plant with high-temperature reactor with the dimensions of 600 MWsub(el). The examination of the utilities basic requirements for a power plant and the experience made during the licensing procedure led to this technical and safety conception for a HTR nuclear power plant with spherical fuel elements. In addition, the questions of the possibility of recurrent tests and of repairing safety components and also the future shut-down of the power plant, which are important for the public utilities, are examined.

34470 **(INIS-mf—7467) Problems of non-proliferation and nuclear safeguards.** Bueker, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)). 1982. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780483.

Paper presented to a meeting jointly organized by Studiengesellschaft zur Foerderung der Kernenergieverwertung in Schiffbau und Schiffahrt e.V. and Kerntechnische Gesellschaft e.V. - Ortssektion Norddeutschland.

The non-nuclear weapons states are allowed to operate sensitive power plants only when they install systems for nuclear materials safeguarding. The Non-Proliferation Treaty in addition to the Atomic-Energy Control Treaty are the basis for this. IAEA and EURATOM have a control-function with inspectors who control the nuclear materials with a view to amount, type, and isotopic composition. .

34471 **(INIS-mf—7468) Collection of arguments for and against the construction of Fast Breeder Reactors in underground nuclear facilities.** (Mayer Beratung, Planung, Ingenieurbearbeitung, Freigericht (Germany, F.R.)). 1979. 84p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780474.

The construction of underground nuclear power stations meets the requirements for higher reactor safety. When disturbances occur the reaction of Na, especially of activated Na, with the environment has to be examined in addition to the requirements known for LWR reactors. The possibilities for inspection, maintenance and repair in the inner, inertized containment have to be maintained on a suitable scale.

34472 **(INIS-mf—7469) Investigations on the assessment and optimization of solidifying weakly radioactive to medium radioactive wastes with hydraulic binders for a new storage technique in salt formations.** Orttmann, C. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 18 Jun 1980. 294p. (In German). NTIS (US Sales Only), PC A13/MF A01. Order Number DE83780480.

Thesis.

The solidification of weakly to medium radioactive wastes using hydraulic binders is investigated in the present work which are to be stored in salt mines according to a new method yet to be developed. Data are given on cement hydration, on the influences of inorganic salts on the hydration behaviour, on corrosion mechanisms in attacking salt solutions as well as viscocity changes of cement suspensions. The first performed systematic serial investigations with 10 different kinds of cement as well as different additives led to a conclusion on the assessment possibilities for safe storage. Following a hydration period of 7 to 28 days, the samples solidified under varying conditions were stored in water, saturated NaCl and carnalite solution to determine the corrosion effect. The dynamic elasticity module, bending strength, pressure resistance, cesium leading, porosity and pore distribution as well as the hydration formation were investigated depending on leaching and time. The dependence between solidification and E-module, degree of hydration and porosity, as well as between pore distribution and leaching behaviour were determined, whereby Portland cement proved to be optimum with regard to long-term stability. Tests on the ability to make pellets, rheological measurements, as well as field tests (storage in salt mines) complete the investigations.

34473 (INIS-SU—125, pp 488) **Calibration of semiconductor gamma spectrometer by means of limited number of energy standards.** Danilenko, V.N.; Kuznetsov, V.P.; Matveev, S.V.; Stepanov, Eh.K. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34474 (INIS-SU—125, pp 499) **Facility for studying radiation damage of structural materials by the differential perturbed angular correlation method.** Esipov, A.A.; Kondrat'ev, N.A.; Poltavtseva, V.P.; Pshenichnikov, G.P.; Yushkov, A.V.; Yanle, R.R. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34475 (PB—83-125013) **Impacts of technology on US cropland and rangeland productivity.** (Office of Technology Assessment (U.S. Congress), Washington, DC). Aug 1982. 272p. NTIS, PC A12/MF A01.

This report describes the major processes degrading land productivity, assesses whether productivity is sustainable using current agricultural technologies, reviews a range of new technologies with potentials to maintain productivity and profitability simultaneously, and presents a series of options for congressional consideration.

5303 Environmental Impact Statements

REFER ALSO TO CITATION(S) 33181

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

REFER ALSO TO CITATION(S) 34635

34476 (AD-A—121185/3) **Decisionmaking organizations with acyclical information structures. Technical report.** Levis, A.H.; Boettcher, K.L. (Massachusetts Inst. of Tech., Cambridge (USA). Lab. for Information and Decision Systems). Aug 1982. 11p. NTIS, PC A02/MF A01.

An analytical model of a team of well-trained human decisionmakers executing a well-defined decisionmaking task is presented. Each team member is described by a two-stage model consisting of a situation assessment and a response selection stage. An information theoretic framework is used in which bounded rationality is modeled as a constraint on the total rate of internal processing by each decisionmaker. Optimizing and satisfying strategies are derived and their properties analyzed in terms of organizational performance and individual workload. The results are applied to the analysis and evaluation of two three-person organizational designs.

5502 Biochemistry

REFER ALSO TO CITATION(S) 33105, 34058, 34208, 34457, 34498, 34501, 34510, 34525, 34530, 34531, 34552, 34564, 34565, 34605, 34606, 34639, 34641, 34642, 34645

34477 (LBL—14986, pp 16-18) **Regulation of red blood cell production in human beings by erythropoietin.** Pennathur-Das, R.; Alpen, E.L.; Vichinsky, E.; Garcia, J.F.; Lubin, B.H. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The human bone marrow contains a mixture of blood cells in various stages of differentiation and maturation. The erythroid progenitor pool in the human marrow, regulated by erythropoietin (Epo), is heterogeneous with respect to Epo-responsiveness. In-vitro culture techniques have identified at least two different populations of erythroid-committed precursor cells with increasing sensitivity to Epo defined as burst-forming units (BFU/sub E/) and colony-forming units (CFU/sub E/). Using anti-Epo to limit the time of exposure of Epo to bone marrow cells, we have demonstrated that the mature erythroid-committed precursor pool, CFU/sub E/, in normal human bone marrow is heterogeneous with respect to Epo-responsiveness. We have now extended our studies to disease states accompanied by chronic erythropoietic hyperplasia, e.g., sickle cell anemia and polycythemia vera.

34478 (LBL—14986, pp 19) **Marrow transfusions into normal recipients.** Brecher, G. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

During the past several years we have explored the transfusion of bone marrow into normal nonirradiated mice. While transfused marrow proliferates readily in irradiated animals, only minimal proliferation takes place in nonirradiated recipients. It has generally been assumed that this was due to the lack of available proliferative sites in recipients with normal marrow. Last year we were able to report that the transfusion of 200 million bone marrow cells (about 2/3 of the total complement of marrow cells of a normal mouse) resulted in 20% to 25% of the recipient's marrow being replaced by donor marrow. Thus we can now study the behavior of animals that have been transfused (donor) and endogenous (recipient) marrow cells, although none of the tissues of either donor or recipient have been irradiated. With these animals we hope to investigate the nature of the peculiar phenomenon of serial exhaustion of marrow, also referred to as the limited self-replicability of stem cells.

34479 (LBL—14986, pp 29-31) **Identification of androgen receptors in the male mouse lung.** Connell, G.M.; Carr, B. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Knowledge of endocrine relationships between hormones and the mammalian lung has emerged and grown over the past 10 to 15 years. Although most of this interest regards fetal and developmental relationships, there is an increasing awareness of the interaction of hormones with the adult lung. Our interest in pulmonary biochemistry began when studies of ozone toxicity were initiated several years ago. Throughout these studies, we were constantly impressed by the grossly divergent responses of adult male and female mice when they were exposed to this common component of photochemical smog. Because the initial and primary injury induced by ozone occurs within the lung, and because the severity of this injury, when measured by survival, appears to be modified by sex hormones, we suggest that a specific response (biochemical change) may occur within the lung as a result of sex steroid action. This would infer that the lung is a target tissue for sex steroid action, although this feature has never been recognized. To be a target tissue for a steroid hormone, specific steroid receptors must be present within the tissue. Thus an attempt to identify sex steroid hormone receptors in the adult male mouse lung was initiated.

34480 (LBL—14986, pp 33-34) **Erythropoietin studies: purification from urine and production of monoclonal antibodies.** Webber, R.J.; Clemons, G.K.; Garcia, J.F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

A scheme for the rapid purification of erythropoietin (Epo) from the urine of patients who are suffering from Fanconi's anemia and Diamond-Blackfan anemia is outlined, and the development of a monoclonal antibody-producing cell line that will open up vast new areas of research concerning the biochemistry and physiology of Epo is discussed. (KRM)

34481 (LBL—14986, pp 100-102) **Use of low density lipoprotein (LDL) colloidal gold complexes to study the distribution of low density lipoproteins on cell surfaces.** Thrift, R.; Forte, T. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Although macrophages, like other cells, have receptors for low density lipoproteins (LDLs), which have been shown epidemiologically to contribute to atherosclerosis, these receptors are subject to feedback inhibition. They cannot mediate a gross accumulation of lipid. Much interest in the macrophage has been stimulated by the discovery that this cell type has receptors for three

modified lipoproteins. A method is being developed to observe the distribution of receptor sites for these various forms of LDL on the surface of macrophages and other cell types.

34482 (LBL—14986, pp 136-137) **Sedimentation equilibrium of human low density lipoprotein subfractions.** Kahlon, T.S.; Adamson, G.L.; Glines, L.A.; Lindgren, F.T. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The molecular weights of low density lipoprotein (LDL) subfractions were determined precisely by meniscus depletion sedimentation equilibrium. Equilibrium speeds ranged from 9743 to 5896 rpm. These values were compared with those obtained by sedimentation velocity at 37,020 and 52,640 rpm (corrected for concentration dependent discrepancies inherent in sedimentation velocity data).

34483 (LBL—14986, pp 138) **Abnormalities in low density and high density lipoprotein subspecies in familial combined hyperlipidemia.** Krauss, R.M.; Nichols, A.V.; Albers, J.; Brunzell, J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Familial combined hyperlipidemia (FCHL) is characterized by elevated plasma apolipoprotein B (apo B) levels, variable lipoprotein phenotype, and increased incidence of premature coronary artery disease. Studies were carried out to determine whether specific distributions of plasma low density lipoprotein (LDL) and high density lipoprotein (HDL) subspecies occur in this disorder.

34484 (LBL—14986, pp 139) **Coordinate changes in levels of serum low and high density lipoprotein subclasses.** Krauss, R.M.; Lindgren, F.T.; Williams, P.; Wood, P. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Subspecies of serum low density lipoproteins (LDL) in normal humans have been shown recently to exhibit highly significant correlations with levels of high density lipoprotein (HDL) subclasses and very low desity lipoproteins (VLDL). The purpose of the present study was to determine whether changes in levels of four major LDL subclasses in 72 healthy middle-aged men over a one year period were correlated with one another or with changes in levels of HDL subclasses or VLDL.

34485 (LBL—14986, pp 139-141) **Model precursors to high density lipoproteins.** Nichols, A.V.; Gong, E.L.; Blanche, P.J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Plasma high density lipoproteins (HDL) appear to play an important role in controlling the accumulation of cholesterol in human arterial tissues. Using gradient gel electrophoresis we have identified five subpopulations in particle size distributions of normal human plasma HDL. The relative distribution of HDL mass among the different subpopulations is strongly associated with the risk of arterial disease and may be indicative of processes involved in the control of arterial cholesterol.

34486 **Yeast endoribonuclease stimulated by Novikoff Hepatoma small nuclear RNAS U1 and U2.** Stevens, A. (Oak Ridge National Lab., TN). *Biochemical and Biophysical Research Communications;* **107**: No. 2, 642-648(30 Jul 1982). Contract W-7405-ENG-26.

Using [$_B$H]m^{7}Gppp[^{14}C]RNA-poly(A) from yeast as a substrate, an endoribonuclease has been detected in enzyme fractions derived from a high salt wash of ribonucleoprotein particles of Saccharomyces cerevisiae. The [^{3}H]m^{7}Gppp[^{14}C]RNA-poly(A) seems to be a preferred substrate since other polyribonucleotides are hydrolyzed more slowly, if at all. The enzyme is inhibited by ethidium bromide, but fully double-stranded polyribonucleotides are not hydrolyzed. The hydrolysis of [^{3}H]m^{7}Gppp[^{14}C]RNA-poly(A) is stimulated about 2.5-fold by the addition of small nuclear RNAs U1 and U2 of Novikoff hepatoma cells. Results show that the stimulation involves an interaction of the labeled RNA with the small nuclear RNA.

34487 **Functional exchange of components between light-activated photoreceptor phosphodiesterase and hormone-activated adenylate cyclase systems.** Bitensky, M.W.; Wheeler, M.A.; Rasenick, M.M.; Yamazaki, A.; Stein, P.J.; Halliday, K.R.; Wheeler, G.L. (Yale Univ. School of Medicine, New Haven, CT). *Proceedings of the National Academy of Sciences of the United States of America;* **79**: 3408-3412(Jun 1982).

Previous studies have noted profound similarities between the regulation of light-activated (3',5'-cyclic-nucleotide 5'-nucleotidohydrolase, EC 3.1.4.17) in retinal rods and hormone-activated adenylate cyclase [ATP pyrophosphate-lyase (cyclizing), EC 4.6.1.1] in a variety of tissues. We report ere the functional exchange of components isolated from the photoreceptor system, which displayed predicted functional characteristics when incubated with recipient adenylate cyclase systems from rat cerebral cortical and hypothalamic synaptic membranes and frog erythrocyte ghosts. We demonstrate functional exchange of photoreceptor components at each of three loci: the hormone receptor, the GTP-binding protein (GBP), and the catalytic moiety of adenylate cyclase. Illuminated (but not unilluminated) rhodopsin was found to mimic the hormone-receptor complex, causing GTP-dependent activation of adenylate cyclase. The photoreceptor GBP complexed with guanosine 5'-[β,γ]imidotriphosphate (p[NH]ppG) produced a marked activation of recipient adenylate cyclase systems. Much smaller activation was observed when GBP was not complexed with p[NH]ppG. A heat-stable photoreceptor phosphodiesterase inhibitor reduced both basal and Mn^{2+}-activated adenylate cyclase activites and this inhibition was reversed by photoreceptor GBPp[NH]ppG. These data demonstrate a remarkable functional compatibility between subunits of both systems and furthermore imply that specialized peptide domains responsible for protein-protein interactions are highly conserved.

34488 **Reciprocal effects of an inhibitory factor on catalytic activity and noncatalytic cGMP binding sites of rod phosphodiesterase.** Yamazaki, A.; Bartucca, F.; Ting, A.; Bitensky, M.W. (Los Alamos National Lab., NM). *Proceedings of the National Academy of Sciences of the United States of America;* **79**: 3702-3706(Jun 1982).

In illuminated rod outer segment membranes, GTP and guanosine 5'-[β, γ-imido]triphosphate (p[NH]ppG) have reciprocal effects on cGMP phosphodiesterase (PDEase; 3':5'-cyclic-nucleotide 5'-nucleotidohydrolase, EC 3.1.4.17) activity and cGMP binding to noncatalytic sites on that enzyme. Two micromolar p[NH]ppG increased PDEase activity more than 2-fold while inhibiting cGMP binding more than 40%. Reduction of noncatalytic cGMP binding, which followed addition of p[NH]ppG, was not a result of PDEase activation. Both effects of p[NH]ppG were completely dependent on the presence of bleached rhodopsin. A heat-stable factor has been found to inhibit PDEase activity and also to stimulate cGMP binding to noncatalytic cGMP binding sites. Addition of p[NH]ppG reversed the effects of this factor on both PDEase activity and cGMP binding. During purification of this material, the activity peaks for both PDEase inhibition and activation of noncatalytic cGMP binding comigrated on both Blue Sepharose CL-6B column chromatography and sucrose density gradients centrifugation, suggesting that the same factor could be responsible for both inhibition of PDEase activity and enhancement of noncatalytic cGMP binding. Limited tryptic proteolysis of PDEase, which markedly reduced cGMP binding to the noncatalytic sites, and experiments using highly purified cAMP (free of cGMP) as substrate for PDEase showed that the binding of cGMP to noncatalytic sites was not required for the heat-stable inhibitory factor to inhibit PDEase activity. We discuss possible relationships between the regulation of PDEase and the binding of cGMP to noncatalytic sites.

34489 **Comparison of the effects of glucose, glucose 6-phosphate and inorganic orthophosphate on the fluorescence and quenchability of hexokinase.** Feldman, I.; Fame, T.M.; Goldstein, D.A. (Univ. of Rochester School of Medicine and Dentistry, NY). *Biochimica et Biophysica Acta;* **703**: 34-41(1982). Contract AC02-76EV03490.

The relative abilities of glucose, glucose 6-phosphate and inorganic orthophosphathe to alter the structure of yeast hexokinase

(ATP:D-hexose 6-phosphotransferase, EC 2.7.1.1) was studied at pH 8.3, 6.5 and 5.5 at 20°C by titrating the tryptophan fluorescence of the P-I(A) and P-II(B) isozymes using each of these three ligands as a quenching titrant and by titrating the fluorescence of the P-I(A) isozyme with acrylamide, a nonionic quencher, in the presence of each ligand. The effective acrylamide-quenching constants and fractional fluorescences of combinations of tryptophan residues were calculated by non-linear least-squares computer analysis. A completely different set of results was obtained with each of the three ligands, which demonstrates that the three hexokinase complexes have different conformations. Comparison of the acrylamide-quenching constants of the P-I and P-II isozymes shows that the cleft and interior of P-I are less penetrable by the nonionic probe than P-II is.

34490 **Histone variants and histone modifications in chromatin fractions from heterochromatin-rich Peromyscus cells.** Halleck, M.S.; Gurley, L.R. (Los Alamos National Lab., NM). *Experimental Cell Research;* **138**: 271-285(1982).

In order to investigate the relationship between condensed heterochromatin and histone modification by acetylation, phosphorylation and amino acid variation, chromatin from cultured Peromyscus eremicus cells, containing 35% constitutive heterochromatin, was fractionated into heterochromatin-enriched and heterochromatin-depleted fractions. The constitutive heterochromatin content of these fractions was determined from satellite DNA content. The distribution of phosphorylated and acetylated histones and amino acid variants of histone H2A in these chromatin fractions was examined by gel electrophoresis. Fractionation of histones demonstrated that endogenous histone phosphatase activity was high in chromatin fractions and could not be inhibited sufficiently to allow accurate histone phosphorylation measurements. However, sodium butyrate did inhibit deacetylation activity in the fractions, allowing histone acetylation measurements to be made. It was found that the constitutive heterochromatin content of these fractions was proportional to both their unacetylated H4 content and their more-hydrophobic H2A content. These observations support, by direct measurement, earlier experiments (Exp cell res 111 (1978) 373; 125 (1980) 377; 132 (1981) 201) suggesting that constitutive heterochromatin is enriched in unacetylated arginine-rich histones, and in the more hydrophobic variant of histone H2A.

34491 **Measuring chlorophyll a and ^{14}C-labeled photosynthate in aquatic angiosperms by the use of a tissue solubilizer.** Beer, S.; Stewart, A.J.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Plant Physiology;* 69: 54-57(1982). Contract AC02-76EV01599.

A compound that quantitatively correlated with chlorophyll a could be measured fluorometrically in the extracts of leaves of three aquatic angiosperms (Myriophyllum heterophyllum Michx., Potamogeton crispus L., Elodea canadensis Michx.) treated with the tissue solubilizer BTS-450. Fluorescent characteristics of the solubilized plant tissues were stable for several weeks in the dark at temperatures up to 60°C but rapidly degraded in sunlight or when acidified. ^{14}C-Labeled photosynthate, which had been fixed by leaf discs during 1- to 10-hour exposure to $H^{14}CO_3$, was also readily extracted by the tissue solubilizer. Solubilizer extraction can, therefore, be used to determine both chlorophyll a content and ^{14}C incorporation rates in the same leaf sample. The method is practical, because no grinding is required, the fluorescent characteristics of the extracts are stable, and analyses can be performed with very little plant material (about 3 milligrams).

34492 **Critical reassessment of the photosystem II content in bundle sheath chloroplasts of young leaves of Zea mays.** Golbeck, J.H.; Martin, I.F.; Velthuys, B.R.; Radmer, R. (Martin Marietta Labs., Baltimore, MD). pp vp of Proceedings of 5th international congress on photosynthesis. Akoyunoglou, G. (ed.). Glenside, PA; Balaban International Science Services, c/o Pomerantz Distributors (1980). Contract AC02-76ER03326.

Several groups have recently argued that mesophyll and bundle sheath chloroplasts of Zea mays have similar photochemical activities. Since earlier work showed bundle sheath chloroplasts to be deficient in oxygen-evolving ability, we reassessed the photosystem II (PS II) content of these two tissues. Our findings indicated that bundle sheath chloroplasts in young leaves of Zea mays have 15 to 20% the oxygen-evolving ability of mesophyll chloroplasts. In agreement with other studies, we found the photosystem I (PS I) content of bundle sheath chloroplasts to be twice that of mesophyll chloroplasts. The PS II/PS I ratio varied from 0.19 to 0.30 in bundle sheath chloroplasts and from 1.1 to 1.4 in mesophyll chloroplasts. We conclude that the number of reaction centers (I and II) in the two tissues, per Chl, is nearly the same: the decreased number of PS II traps correlates with a complementary increase in PS I.

34493 **Nucleosomes: composition and substructure.** Rill, R.L. (Florida State Univ., Tallahassee). pp 247-313 of Molecular genetics, Part III. New York, NY; Academic Press, Inc. (1979).

Despite morphological variations in the chromosomal material with cell cycle and between species, at one level all of eukaryotic chromatin appears to be remarkably similar. This is called the primary level of chromatin structure where interactions of DNA and histones form a subunit called a nucleosome. The focus of this review with over 250 references is on the isolation, characterization, and internal structural features of nucleosomes. (KRM)

5503 Cytology

REFER ALSO TO CITATION(S) 34097, 34481, 34506, 34556, 34566, 34592, 34622

34494 **(LA-UR—83-1076) uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells.** MacInnes, M.A.; Bingham, J.M.; Strniste, G.F.; Thompson, L.H. (Los Alamos National Lab., NM (USA); Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-36. 11p. (CONF-830440—2). NTIS, PC A02/MF A01. Order Number DE83011323.

From UCLA symposia on molecular and cellular biology; Keystone, CO, USA (10 Apr 1983).

uvc-sensitive mutants of CHO cells provide a model system for molecular studies of DNA repair. We present our recent results which show that these mutants are competent recipients for plasmid marker gene transfer and incorporation of a putative CHO repair gene. The applicability and advantages of this system for interspecies human repair gene identification are discussed.

34495 (LBL—14986, pp 31-32) **Evidence for a suppressor cell in short-term bone marrow cultures.** Goodman, J.W.; Shinpock, S.G.; Hall, E.A. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

In the course of in vitro studies of hemopoietic progenitors in mouse bone marrow, we became interested in 3 to 4 day colonies similar to those described as raspberry-like clusters by others who believed them to be comprised of pre-T cells on the bases of morphology and thymopoietin-inducibility. Not yet convinced of their identify as progenitors of the T (thymus-dependent) lymphocyte series, we carried out preliminary studies and are continuing to investigate characteristics of these cells. This report will deal with in vitro expression of progenitor content of short-term cultures, grown with 10% horse serum either with (pre-T) or without (cultured marrow or CBM) 10% pokeweed mitogen conditioned medium, and with ability of cultured cells to suppress normal bone marrow in assays for CFU-C, CFU-E, and BFU-ME.

34496 (LBL—14986, pp 92-95) **Fundamental and applied studies on cell-membrane systems.** Mel, H.C.; Akeson, S.P.; Richieri, G.; Kooi, F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Our laboratory research this year falls into two categories: an ongoing physical and technical study of the multipurpose experimental apparatus and methodology called resistive pulse spectroscopy (RPS), and the application of RPS to problems of interest in both basic membrane biophysics and clinical hematology.

34497 (LBL—14986, pp 123) **Properties of human mammary epithelial cells in culture.** Stampfer, M.R.; Bartley, J.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The authors have improved their system for growing human mammary epithelial cells in culture by collaborating with Dr. Richard Ham of the University of Colorado to develop a serum-free defined medium for these cells. Using a modification of Ham's medium MCDB202, plus several growth factors, we can now grow normal and tumor-derived cells in mass culture for 10 to 16 passages. Clonal growth is also supported by this medium. These results greatly expand the usefulness of this system, because practically unlimited numbers of cells can now be generated from individual specimen donors.

34498 (LBL—14986, pp 127-129) **Extracellular matrix influences on gene expression: the role of matrix components in modulating the differentiated phenotype of mammary epithelial cells.** Parry, G.; Lee, E.; Bissell, M.J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The concept that expression of genetic information may be regulated by extracellular matrix components has recently gained support from several sources, and has prompted consideration of the possibility that tissue-specific differentiation and maintenance of a differentiated phenotype may be influenced by the substratum to which cells are attached. An experimental system that we have chosen to investigate this idea is that of cultured mouse mammary epithelial cells, because these cells respond to their attachment substratum in a striking manner. Cells can be isolated from mammary glands of mid to late pregnant mice by using digestive enzymes, and maintained as viable cultures in the presence of lactogenic hormones. If the cultures are maintained on collagen gels that are made to float in the culture medium they adopt a columnar epithelial morphology characterisitc of secretory mammary epithelia and assemble an array of intracellular organelles required for protein secretion.

34499 (LBL—14986, pp 132) **Biophysical studies of immune recognition.** Owicki, J.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Our research focuses on the basic mechanisms of interactions involving biological surfaces. The general problem addressed is: how do the specificity and strength of biological recognition processes depend on the physical and chemical states of the macromolecular assemblies whose interactions underlie the phenomena. Such questions have broad significance in several biological disciplines. Our own interests primarily concern the immune system, where the problem relates to the complex interactions among cells and antibodies that regulate immune responses. As is common in biophysics, the complexity of native biological systems precludes convenient investigation. Using a model system is the most efficient route to understanding the molecular bases of the recognition process. Aqueous dispersions of phospholipids spontaneously aggregate into lipid bilayers that can be made to form spherical vesicles 0.1 to 10 micrometers in diameter.

34500 **Initial growth rate, population density, and cation content as limiting factors in the multiplication of nontransformed and transformed 3T3 cells.** Rubin, H. (Univ. of California, Berkeley). pp 33-45 of Biology of normal human growth. Ritzen, M. (ed.). New York, NY; Raven Press (1981). Contract AT03-79EV10277.

This laboratory has concentrated on studying the effects of Mg^{2+}, on cell growth rate and saturation density, at first because there was considerable evidence that Mg^{2+}, plays a prominent role in the regulation of metabolism and growth but later because it proved to be particularly versatile in controlling growth. We have also examined the effects of Ca^{2+}, K^+, and Na^+ limitation. From the use of growth-limiting concentrations of Mg^{2+} and Ca^{2+}, it was found that the ultimate saturation density of a population of nontransformed 3T3 cells is proportional to the initial growth rate of the population and that saturation can occur even before a culture has become confluent. When the growth rate of a transformed line of 3T3 cells was reduced by severely limiting the concentration of Mg^{2+}, the cells took on the flattened appearance and regulatory behavior of nontransformed cells. This did not happen when any of the other major cations was growth-limiting. This finding is considered in the light of the hypothesis, that the major lesion in transformation is the loss of the regulatory role of Mg^{2+}. It was also found that both transformed and nontransformed cells kept in growth-limiting concentrations of Mg^{2+} for a week or longer became adapted to this condition, as expressed by a marked increase in the rates of DNA synthesis and cell multiplication. In addition, the transformed cells, which had become flattened in low Mg^{2+}, resumed their original morphology and capacity to grow to high densities. This suggests that animal cells have a well-developed capacity to adapt to abnormally low concentrations of Mg^{2+} and perhaps of other substances as well.

34501 **Isolation and characterization of chromatin subunits.** Rill, R.L. (Florida State Univ., Tallahassee); Shaw, B.R.; Van Holde, K.E. pp 69-103 of Methods in cell biology. Vol. 18. New York, NY; Academic Press, Inc. (1978).

This chapter describes methods used in laboratories to isolate and study the subunits of chromatin which are specific aggregates of histone proteins that appear to serve as nuclei about which the DNA is periodically folded. A brief review of recent history into the characterization of chromatin structure is presented. The chapter focuses on the nuclease digestion of nuclei or chromatin, the isolation of core particle subunits and other nucleoprotein fragments, and the characterization of core particle subunits. An appendix gives detailed instructions on gel electorphoresis of DNA and histones, and on the determination of acid-soluble oligonucleotides. (KRM)

5504 Genetics

REFER ALSO TO CITATION(S) 33360, 34559, 34564, 34565, 34570, 34617

34502 (LBL—14986, pp 107-109) **Isolation and characterization of yeast DNA repair genes.** Mortimer, R.K.; Schild, D.; Calderon, I.L.; Contopoulou, R.; Johnston, J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Several different DNA repair pathways have been identified in the yeast Saccharomyces cerevisiae, including excision repair, error-prone associated repair, photo-reactivation and a presumptive recombinational repair pathway. The genes in the RAD50 to RAD57 epistasis group are thought to be involved in recombinational repair, since mutations in some of these genes decrease both repair and recombination. Although many phenotypes have been associated with mutations in the genes of this pathway, no enzyme or structural protein (such as a DNA binding protein) has been determined to be the product of any of these genes. In order to study these genes at the molecular level and to isolate and characterize their primary gene products, the authors have cloned several of them.

34503 (LBL—14986, pp 109-110) **Genetic map of the yeast Saccharomyces cerevisiae.** Mortimer, R.K.; Schild, D. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

In 1980 the authors compiled all of the genetic mapping data of the brewing and baking yeast Saccharomyces cerevisiae and published it as a review article. Since then, many new yeast genes have been mapped and the authors have completed a new compilation of these data. The new genetic map dearibes the location of 415 genes, including 98 new genes added since our 1980 map.

34504 (LBL—14986, pp 111-114) **Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae.** Esposito, M.S.; Bruschi, C.V.; Maleas, D.T.; Bjornstad, K. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Previous studies provided evidence that mitotic and meiotic recombination in yeast cells differ in a number of basic properties. Our research during the past year has focused upon a comparative analysis of mitotic and meiotic recombination in diploids homogyzous for the spo11-1 mutation which affects both mitotic and meio-

tic recombination and confers a phenotype predicted by the prereplicational model of mitotic recombination. The characterization of the spo11-1 mutation suggests that addition rec mutations would aid in understanding the mechanisms of mitotic and meiotic recombination.

34505 **Mammalian mutagenesis: future directions.** Russell, L.B.; Bernstine, E.G. (Oak Ridge National Lab., TN). pp 345-359 of Molecular and cellular mechanisms of mutagenesis. Lemontt, J.F.; Generoso, W.M. (eds.). New York, NY; Plenum Publishing Corp. (1982). Contract W-7405-ENG-26.

This paper briefly summarizes investigations into the nature of the genetic alterations recovered in certain mammalian germ-line mutagenesis studies. Specific-locus tests, which are usually conducted primarily to provide quantitative information on mutation rates, yield genetic material of potential value to the future directions of research (which are the subject of this Session). Methods will be proposed by which the mutants can be used as tools for studies of genomic organization and gene expression in mammals. Finally, the paper will also briefly examine some ways in which analysis of mutations can be made to relate to pragmatic questions of mutagenesis - questions which will continue to be asked particularly in relation to risk.

5505 Metabolism

REFER ALSO TO CITATION(S) 34562

34506 (LBL—14986, pp 129-131) **New method for the study of energy metabolism in living cells using nuclear magnetic resonance.** Karczmar, G.S.; Koretsky, A.P.; Bissell, M.J.; Klein, M.P. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The biochemistry of glycolysis and respiration is well understood, but we do not yet have a good understanding of how these processes are regulated. Steady state rates of turnover for ATP and glycolytic intermediates are difficult to determine using traditional biochemical methods. In addition, it has been difficult to study the way in which these rates, and the steady state levels of metabolites, are related to pH and other physical characteristics of the cell. Changes in glycolysis are known to occur concomittantly with malignant transformation; thus an understanding of the regulation of glycolysis may improve our ability to decipher the process of transformation. The authors study high energy metabolism using secondary chicken embryo fibroblasts (CEFs) grown in culture.

34507 **Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity.** Francko, D.A. (Michigan State Univ., Hickory Corners); Wetzel, R.G. *Journal of Freshwater Ecology;* **1**: No. 4, 365-371(Apr 1982). Contract AC02-76EV01599.

Daphnia pulex, a common cladoceran zooplankton species, contains tissue cAMP concentrations similar to those found in algae, bacteria, and aquatic macrophytes. Daphnia release significant quantities of cAMP into the extracellular medium. Release of algal cellular cAMP as a result of digstive degradation of algal cells may also be an important source of dissolved cAMP in lakewater.

34508 **^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo.** Crawford, E.J. (Univ. of California, San Diego, La Jolla); Friedkin, M.; Wolf, A.P.; Fowler, J.S.; Gallagher, B.M.; Lambrecht, R.M.; Macgregor, R.R.; Shiue, C.Y.; Wodinsky, I.; Goldin, A. *Advances in Enzyme Regulation;* **20**: 3-22(1982). Contract AC02-76CH00016.

Increased metabolic trapping of labeled fluorouridine reflects the interaction of three parameters in rapidly proliferating tissues: increased rates of intracellular phosphorylation, increased rates of transport, and increased rates of synthesis of RNA. We have taken advantage of these metabolic phenomena, demonstrating that the uptake of ^{18}F-5-fluorouridine, a positron-emitting radiopharmaceutical, can provide a very practical means for measuring changes in proliferative states of tissues in vivo. Two major changes in proliferative states have been examined: one involves changes in growth of normal mouse tissues induced by pharmacological agents; the other involves tumor growth and neoplastic infiltration in mice and rabbits. We describe tracer experiments with ^{18}F-5-fluorouridylate and with ^{18}F-5-fluorouridine. Uptakes of ^{18}F after a pulse of ^{18}F-5-fluorouridine were increased in mouse spleen following phenylhydrazine treatment to induce increased splenic erythropoiesis. Uptakes of ^{18}F in various mouse tissues were decreased following pretreatment with actinomycin D. This finding is consistent with the known inhibitory action of actinomycin on RNA synthesis. Intracerebral Zimmerman ependymoblastoma tumors showed extraordinarily high uptakes of fluorine-18 in mice injected intravenously with ^{18}F-5-fluorouridylate or with ^{18}F-5-fluorouridine in contrast to very low uptakes by normal brain tissue. After intracerebral injection of mice with suspensions of L1210 leukemia cells, distant organs such as lung, liver, and spleen became involed. These tissues showed significant increases of radioactivity after pulse labeling with ^{18}F-5-fluorouridylate consistent with histological evidence for infiltration of these tissues by neoplastic cells. Intramuscular VX2 carcinoma tumors in rabbits showed localized uptakes of ^{18}F significantly higher than surrounding normal muscle tissue.

34509 **Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling.** Hanson, R.B. (Skidaway Inst. of Oceanography, Savannah, GA); Tenore, K.R.; Bishop, S.; Chamberlain, C.; Pamatmat, M.M.; Tietjen, J. *Journal of Marine Research;* **39**: No. 3, 417-440(1981).

Twelve stations in the Georgia Bight were sampled in June 1977. Bottom sediments were collected at depths of 20-25 cm at inner, middle and outer shelf regions. Results suggest that the shelf break benthos is enriched by intrusion of nutrient-rich deep Gulf Stream waters off Florida. However, the mid shelf benthos is, in general, impoverished because of sporadic and patchy nutrient inputs from intrusions and meager nutrient enrichments from estuarine outwelling beyond the outer shelf. (JMT)

34510 **Photosynthetic carbon metabolism in the submerged aquatic angiosperm Scirpus subterminalis.** Beer, S.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Plant Science Letters;* **21**: 199-207(1981). Contract AC02-76EV01599.

Scirpus subterminalis Torr., a submerged angiosperm abundant in many hardwater lakes of the Great Lakes region, was investigated for various photosynthetic carbon fixation properties in relation to available inorganic carbon and levels of carbon fixing enzymes. Photosynthetic experiments were CO_2 and HCO_3^- were supplied at various concentrations showed that Scirpus was able to utilize HCO_3^- at those concentrations close to natural conditions. However, when CO_2 concentrations were increased above ambient, photosynthetic rates increased markedly. It was concluded that the photosynthetic potential of this plant in many natural situations may be limited by inorganic carbon uptake in the light. Phosphoenolpyruvate carboxylase (PEPcase)/ribulose-1,5-bisphosphate carboxylase (ruBPcase) ratios of the leaves varied between 0.5 and 0.9 depending on substrate concentration during assay. The significance of PEP-mediated carbon fixation of Scirpus (basically a C_4 plant) in the dark was investigated. Malate accumulated in the leaves during the dark period of a 24-h cycle and malate levels decreased significantly during the following light period. The accumulation was not due to transport of malate from the roots. Carbon uptake rates in the dark by the leaves of Scirpus were lower than malate accumulation rates. Therefore, part of the malate was likely derived from respired CO_2. Carbon uptake rates in the light were much higher than malate turnover rates. It was estimated that carbon fixation via malate could contribute up to 12% to net photosynthetic rates. The ecological significance of this type of metabolism in submerged aquatics is discussed.

5506 Medicine

REFER ALSO TO CITATION(S) 34280, 34313, 34378, 34602

34511 (BNL—32891) Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra. Hankes, L.V.; Jansen, C.R.; DeBruin, E.P.; Schmaeler, M. (Brookhaven National Lab., Upton, NY (USA); Atomic Energy Board, Pelindaba, Pretoria (South Africa). Life Sciences Div.). 1983. Contract AC02-76CH00016. 8p. (CONF-830470—1). NTIS, PC A02/MF A01. Order Number DE83011624.

From 4. international meeting on tryptophan metabolism; Munich, F.R. Germany (19 Apr 1983).

The metabolism of kynurenine, a metabolite in the tryptophan-niacin pathway, before and after vitamin B6 therapy was studied in pellagra patients. The patients given vitamin B6 showed a higher metabolism of L-kynurenine-keto-^{14}C than the patients without vitamin B6. (ACR)

34512 (BNL—32905) Age- and sex-related changes in bone mass measured by neutron activation. Cohn, S.H.; Aloia, J.F.; Vaswani, A.N.; Zanzi, I.; Vartsky, D.; Ellis, K.J. (Brookhaven National Lab., Upton, NY (USA)). 1981. Contract AC02-76CH00016. 23p. (CONF-8105102—2). NTIS, PC A02/MF A01. Order Number DE83011620.

From International symposium on osteoporosis; Jerusalem, Israel (31 May 1981).

Total-body calcium (TBCa) measurements have been employed in two basic types of studies. In the first type, serial measurements made on an individual patient are used to trace the time variation in body calcium. In the second type of study, the absolute total body calcium of an individual is determined and compared to a standard or predicted value in order to determine the deficit or excess of calcium. Generally, the standards are derived from data obtained from normal populations and grouped by the parameters of age and sex (mean value denoted TBCa/sub m/). In the study reported in this paper, the clinical usefulness of predicted calcium (TBCa/sub p/) is evaluated. The predicted value (TBCa/sub p/) for an individual is obtained with an algorithm utilizing values of sex and age, height and lean body mass (as derived from ^{40}K measurement). The latter two components characterize skeletal size and body habitus, respectively. For the study, 133 white women and 71 white men ranging in age from 20 to 80 years were selected from a larger population. Individuals with evidence of metabolic calcium disorders or osteoporosis were excluded. Additionally, the women and men selected were first judged to have total body potassium levels in the normal range. For each age decade, the variance of TBCa values of these individuals, when expressed in terms of TBCa/sub p/, was significantly less than when expressed in terms of TBCa/sub m/. Thus, erroneous conclusions based on Ca deficit in osteoporosis could be drawn for individuals whose height and body size differ markedly from the average, as the variation of their TBCa values often exceeds the variation in the age and sex cohort. Data on a group of osteoporotic women were compared with the normal skeletal baseline values both in terms of the TBCa and the TBCa/sub p/ values.

34513 (INIS-mf—7133) XVIIIth nuclear medicine days. Abstracts of papers. (Ceska Lekarska Spolecnost J.E. Purkyne, Prague (Czechoslovakia). Spolecnost Nuklearni Mediciny a Radiacni Hygieny). [nd]. 19p. (In Czech and Slovak). (CONF-7911183—Absts.). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780455.

From 18. nuclear medicine days conference; Gottwaldov, Czechoslovakia (14 Nov 1979).

The methods of uropoietic system examination using radiopharmaceuticals, physical and technical aspects of examination techniques, RIA and test methods in the preparation of radiopharmaceuticals were the subjects of papers submitted to the XVIIIth nuclear medicine days reported. Abstracts of papers are included.

34514 (INIS-mf—7412) Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas. Moeller-Kuhlmann, G. (Technische Hochschule Aachen (Germany, F.R.). Medizinische Fakultaet). 16 Apr 1980. 81p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780465.

Thesis.

Intention of the present study was to refer the silhouettes of the irradiation field to anatomically definite osseous structures. For this examination, the caudal, cranial and the lateral borders were marked by different methods and their position with respect to the corresponding osseous structures was detected. For documenting the soft-tissue structures the following techniques could be applied: lymphography, hysterosalpingography, vaginal contrasting and computerized tomography. The evaluation of the obtained results showed that the dorsal silhouette ranges between the 4th and 5th lumbar vertebrae, that the lateral silhouette reaches the middle of the head of the femur and that the caudal one includes the obturator. The detection and definition of the target area for curative radiotherapy of corporal and cervical carcinomas can therefore renounce on the contrast representation of soft-tissue organs. On the contrary it is even possible to adjust the irradiation field with the therapy simulator under consideration of anatomically fixed osseous structures.

34515 (INIS-mf—7413) Roentgenologic examinations on the larynx of the horse. Bargheer, K.W. (Tieraerztliche Hochschule Hannover (Germany, F.R.)). 21 Jun 1979. 46p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780450.

Thesis.

The euqine larynx was radiographed from 56 living animals and from 64 isolated specimens. The age of the horses ranged between 10th gestational month and 29 years. Due to the anatomical situs it was impossible to show the entire picture of the larynx. However, the X-rays obtained conformed with those of the dissected specimen. A current appearance in all horses is the ossification of the hyaline larynx. There could not be observed any influence due to race or sex. In 38 cases of roaring, no progress in ossifications was apparent. After surgical intervention at the larynx in 4 cases pathological ossification was found. It was assumed that it was due to the traumatisation of the cartilage during the surgical intervention and ensuing inflammation. This type of ossification differs even macroscopically from the other types by exaggerated bony growth. Animals with pathologic ossification of the larynx are unfit for sporting purpose.

34516 (INIS-mf—7414) Radiotherapy of breast fibrosis. Heibel, J.H. (Kiel Univ. (Germany, F.R.). Medizinische Fakultaet). 3 Dec 1979. 28p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780466.

Thesis.

In a retrospective study, radiotherapy of breast fibrosis in hormone-treated men with histologically confirmed prostate carcinoma was examined. 10 patients had received hormones even before irradiation, 113 obtained hormone administration only after irradiation. The objective size of the glandular body and the overall size of the breast were measured with a special method developed by the author. 46 patients indicated complaints. With hypertrophic mamma and hypertrophic mamilla in 67 examined patients, 127 different symptoms resulted in total. Four patients of the group who had obtained hormones before irradiation, suffered from subjective symptoms. It resulted that radiotherapy of breast fibrosis carried out during hormone treatment is no gynecomastia prophylaxis, that already existent mamma hypertrophies are irreversible, but that existent sensations were notably reduced within 6 months after irradiation therapy. These results indicate the necessity of a radiotherapy of the mamma fibrosis before the hormone treatment is begun. Particularly in cases of higher operative risks, also the possibility of preferring radiotherapy to mastectomy should be fully utilized, in view of adequate or even better therapeutic results.

34517 (INIS-mf—7417) X-ray emission of high voltage vacuum devices. Dohnal, D. (Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik). 5 Feb 1981. 168p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780468.

Thesis.

As a result of this study, during the operation of commercial vacuum switching tubes with nominal voltages no X-radiation is produced in contrast to high voltage high vacuum devices in the field of power technology, where X-ray production is possible.

Thus for vacuum switching devices for medium voltages there are no problems with respect to radiation protection. Although the X-ray intensity shows an exponential voltage dependency the development of vacuum switch chambers up to 140 kV is feasible as the X-rays produced can be mastered by a suitable design. The relation between the X-ray intensity and the design characteristics of such devices are considered, taking into account the geometry, material and surface properties of the electrodes.

34518 **(INIS-mf—7420) Negative brain scintigrams in brain tumors.** Dalke, K.G. (Freie Univ. Berlin (Germany, F.R.). Medizinische Fakultaet). 26 Apr 1978. 64p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780456.

Thesis.

With 53 histologically verified and 2 histologically not identified brain tumors, that showed a negative scintigram, it was tried to find reasons for the wrong and negative dropout of these scintigrams. The electroencephalograms and angiograms, that were made simultaneously were taken into consideration with respect to their propositional capability and were compared with the scintigram findings. For the formation of the negative brain scintigrams there could be found no unique cause or causal constellation. The scintigraphic tumor representation is likely based on a complex process. Therefore the reasons for the negativity of the brain scintigrams can be a manifold of causes. An important role plays the vascularization of the tumor, but not in a sole way. The tumor localization gains some importance; especially in the temporal lobe or in the deeper structures situated tumors can be negative in the scintigram. To hold down the rate of wrong-negative quote in the case of intracranial tumor search, one is advised to continue with an further exposure after 2 to 4 hours besides the usual exposures, unless a sequential scintigraphy was made from the beginning.

34519 **(INIS-mf—7421) Development of a low-pressure proportional chamber for particle detection in ion-X-ray-coincidence experiments and a study of inner shell differential ionisation probabilities.** Staehler, J. (Dortmund Univ. (Germany, F.R.). Abt. Physik). 21 Jan 1981. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780475.

Thesis.

The ionization chamber is based on design principles of the chambers used in high energy physics. With a low mass coverage of less than 1 mg/cm^2 heavy ions ($Z>20$) with energies higher than 10 MeV can be detected in both spacial directions. Experiments have been performed to measure the K-shell ionization probability and to study the quasi-molecular L-radiation, in the case of which structures in the differential emission cross-sections have been observed. In addition, by double differential measurements the formation of short-lifed molecular states can be studied.

34520 **(INIS-mf—7422) Improvement of the detection efficiency of Li-drifted Ge-detectors for \-radiation by irradiance with infrared-light of the wavelength 1.520μm to 1.795μm.** Schneider, W. (Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 28 Jun 1980. 76p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780476.

Thesis.

By irradiation of Ge(Li)-detectors with 0.69-0.82 eV IR-radiation simultaneously with the Gamma radiation, the full energy peak efficiency can be increased by 60%, the counting rate in the full energy peak and the peak-to-background ratio by 136% and 138% respectively. The improved charge accumulation is caused by additional charge carriers, which occupy trapping levels, thus decreasing the trapping probability.

34521 **(INIS-mf—7425) Pre-surgical radiologic diagnostics of pancreas diseases.** Seifried, C. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 18 Dec 1979. 117p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780451.

Thesis.

At the example of a comparative study with 112 patients it should be demonstrated that the different radiologic techniques are complementary in pancreas diagnostics with respect to their indication and proposition. The study yields the following procedure for the pancreas diagnostics: cysts and pancreatites are diagnosed by means of sonography and computed tomography. Stomach-colon-barium passage and intravenous cholangio cholecystography can be applied for clarification of functional reactions on the stomach-colon regions, respectively the biliary region. Only in a complicated process in a sustaining tumor suspicion or before surgery should angiography be used. In pancreatitis also the endoscopic retrograde cholangio-pancreatiography is used. Tumors are generally submitted to angiography for clarification of diagnosis, resiscivity, and vessel conditions.

34522 **(INIS-mf—7426) Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths.** Jaegers, M. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Medizin). 26 Jan 1981. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780457.

Thesis.

For an estimation of regional brain perfusion after intravenous injection of /sup 99m/Tc-pertechneate, the author followed the registration of the initial perfusion input in ventrosagittal or lateral setting of the scintillation camera in 74 patients. The time-activity characteristics were obtained across standardized regions, the mode of evaluation was applied as mentioned. A mean value of 49.1 for the perfusion of the right hemisphere was determined, for the left one it was 49.7 ml/100g/min. The regional mean values lay between 44.4 (parietal region) and 39.6 (temporal region) ml/100g for the lateral position. Thirty-one patients with intracronical growths were examined either directly before surgery or one year before it. In 22 of the patients examined before surgery a significantly lower regional perfusion could be computed for the ventral position; whereas the lateral perfusion values corresponded to values of healthy persons. The orienting calculation of regional brain perfusion at longer intervals after tumor extirpation did not show a significant difference to the clinically-neurologically inconspicuous patient collective in lateral exposure position normal patients. In 12 cases the calculation of the regional perfusion followed directly via the tumour. On an average, the values were about 8.2 ml/100g/min lower than in normal cases.

34523 **(INIS-mf—7427) Scintigraphic evaluation of the sacroiliac joints in anklylosing spondylitis.** Schoerner, W. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Humanmedizin). 12 Nov 1980. 97p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780458.

Thesis.

The sedimentation of /sup 99m/Tc-phosphate complexes into the sacroiliac joints was investigated in 94 patients with loin pains and suspected of ankylosing spondylitis (SpA) and a control group of 96 healthy patients. The investigation yields the following results: the visual evaluation of the scintigrams does not allow a reliable diagnosis and should be replaced by a semi-quantitative technique; the index ISC/sacrum does remarkably depend on age, even in young patients the scintigraphic examination appears to be useful to alidate the clinical suspicion of sacroilictis which is in contradiction to literature, with increasing SpA the scintigraphic detectability of changes in the ISG decreases. The floriditily of the ISG process determines the scintigraphic detectability of the process of the disease; the scintigraphic finding is unspecific. Inflammatory states of the disease of different genesis and degenerative processes in the ISG equally yield pathological index values.

34524 **(INIS-mf—7428) Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen.** Mayer-Wehrstein, R. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Humanmedizin). 13 Feb 1981. 85p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780459.

Thesis.

Two nuclear techniques were investigated for determination of the effective renal plasma flow with I-131-Hippuran in rabbits: whole-body measurement according to Oberhausen and clearance

determination with a radiation controlled feedback infusion pump. In the first method the clearance determination follows after a single injection of the testing substance in the decreasing phase of the blood level, in the second method a constant blood level of the testing substance is maintained. A technique was developed for the determination of the blood-tissue ratio by considering the values determined by the constant blood level. The exact clearance values were computed for the decreasing plasma level. Nineteen clearance determinations were performed in rabbits.

34525 **(INIS-mf—7429) Radioimmunologic determination of testosterone and 5α-dihydrotestosterone in the plasma of women with hirsutism.** Richter, H.J. (Tuebingen Univ. (Germany, F.R.). Medizinische Fakultaet). 1981. 132p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780460.

Thesis.

The testosterone (T) and 5α dihydrotestosterone (DHT) concentrations were investigated in 270 women with hirsutism by means of radioimmunology in the peripheral plasma. The technique of the radio-immunological determination of the hormones T and DHT by chromatographic column separation is described in detail. The average concentrations of T were 530 +- 297 pg/ml and of DHT 312 +- 191 pg/ml. This way they are higher than in healthy women. Then, the results of the particular determinations were evaluated and compared with clinical data.

34526 **(INIS-mf—7430) X-ray cineradiography with particular and non-particular contrast-media. A comparative study for theory and praxis.** Vaitl, D. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 17 Jul 1980. 62p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780461.

Thesis.

X-ray cineradiography with 400 pictures per second delivers a lot of problems, that are practically investigated in animal studies and in circuit models and that are treated theoretically by calculation of the local and time-wise modulation transfer function and estimation of the transferred time frequencies. The choice of a contrast media is a central part, where the advantages and disadvantages of particular and non-particular substances are compared with each other and new polymerous and non-ionizing substances are discussed. Brod space is devoted to the production and application of contrast media based on gelantin (particular, non-particular). Further modifications are presented for human application. Then the X-ray apparatus is described that works with pulsed X-ray radiation of one milisecond pulse length and that is able to detect object velocities up to 400 mm/sec in real-time (Nyquist-criteria). Radiation protection measurements show an altogether relatively high dose load that demands the application of all possible protection measures. The documentation of the examination results onto 16 mm film is performed by alterations of film sensitivity, film materials and development parameters, in order to optimize the photographic side of the X-ray cine radiography, too. An overview is given of technically realizable detail improvements of the apparatus and of possible future developments.

34527 **(INIS-mf—7435) Perfusion measurements with radioactively labelled microspheres. Technique and computer-based evaluation.** Schosser, R. (Muenchen Univ. (Germany, F.R.). Fakultaet fuer Medizin). 31 Jul 1980. 104p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780462.

Thesis.

The technique and the evaluation of the microsphere-method are comprehensively represented in theory and practice. Some changes and new concepts are discussed, besides the known foundations and techniques, that assure an essential methodic improvement resp. practical simplifications. Two new formulas are derived within the frame of the theoretical principles by which the absolute flux of shorts can be calculated. The determination of the optimal indicator dose is defined and formulated mathematically with respect to the experimental conditions to be expected. The matrix method was designed for the analysis of complex gamma spectra. There is no selective error accumulation in the case of low energy radionuclides contrary to the stripping technique. The number of possible error quantities was reduced by one resp. two variables. The error of particular radionuclide components is quantitatively computed as standard deviation by means of the theory of approximated systems of linear equations. The external measurement of distance was developed. This technique is less susceptible to errors as the whole body measurement technique. A flexible computer program for a desk top computerwas developed for the evaluation. The data from the gamma spectrometer are recorded on tape and automatically input by the computer.

34528 **(INIS-mf—7439) Sonography and computerized tomography in a comparison in renal mass diseases.** Brommer, M. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 15 Jan 1981. 78p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780452.

Thesis.

One hundred and thirteen patients with renal mass processes were examined sonographically and by computized tomography. The diagnosis was assured in 32 cases histologically, in 40 cases angiographically clinically and by the course and in 41 cases only clinically and by sonographic and computerized tomography control studies. The accuracy of a hit in sonography is smaller compared with computerized tomography with fast image formation. However, due to its relative safety, it is judged as the most useful technique for a first diagnosis of renal masses after ureographic diagnostic of excreta. A diagnostic procedure is proposed in which the number of necessary angiographies and diagnostic sampling surgery can be considerably reduced. (orig.).

34529 **(INIS-mf—7447) Spondylarthritis Ankylopoietica and its treatment with thorium X. Follow-up examinations carried out on patients of the Orthopaedic University Clinics Wuerzburg (Universitaetsklinik Wuerzburg).** Liska, G. (Wuerzburg Univ. (Germany, F.R.)). 18 Dec 1980. 162p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780467.

Thesis.

After a detailed and comprehensive survey over the history of the spondylarthritis ankylopoietica or Bechterew's disease, and over the thorium X therapy, experiences with patients are described. The patients received a Th-X therapy, supplemented by prednison phenylbutazone administration, with a total dose of up to 1000 to 2400 e.s. E. Th X. In addition, an intensive physicobalneologic and physiotherapeutic treatment was carried out. More than two thirds of the patients expressed their satisfaction with the results achieved.

34530 **(INIS-mf—7448) Clinical relevance of radioimmunologic gastrin determination for peptic ulcer.** Boesl, F. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 26 Feb 1980. 176p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83780463.

Thesis.

The clinical validity of the specific and sensitive radioimmunoassay proven by the verification of the gastrin concentrations in the fasting serum of healthy control persons and of defined patient groups: duodenal ulcer, gastric ulcer, peptico-jejunal ulcer, chronically atrophic gastritis with and without pernicious anaemia, pyloric stenosis, gastric carcinoma and renal insufficiency. The result of the examinations carried out with a standardised beverage test was that the serum gastric release, which was basally and postprandially increased with respect to healthy control persons, is significantly increased by selective and proximal vagotomy in patients with chronically recurrent duodenal ulcer. Pyloroplasty has no significant influence on the serum gastrin reaction after selective proximal vagotomy. Contrary to that the reduced basal serum gastrin values of patients with Billroth II gastrectomy could not be stimulated by the beverage test. The basal and postprandial hypergastrinaemia existing after selective proximal vagotomy does not change significantly during the first postoperative year. In order to statistically compare such studies the authos suggests the integrated overall gastrin release. Synchronous measurements of insulin and blood-sugar reactions do not give any indication that hypergastrinaemia, induced by selective proximal vagotomy, causes any change of the endocrine pancreatic function. Several examples illustrate the higher diagnostic value of the secretin provocative and calcium infusion test in cases of the Zollinger-Ellison syndrome and that of

the standardised beverage test in antral G-cell hyperplasia. In most cases the glucagon test is not required.

34531 (INIS-mf—7450) **Investigations on a cortisol-iodine-125-radioimmunoassay test system.** Hegerl, U. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Medizin). 23 Feb 1981. 48p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780464.

Thesis.

On the basis of a cortisol-iodine-125-RIA test system the reliability criteria were detected. Additionally, the so-called normal values of the cortisol daily rhythm were determined in a test group with normal metabolism. Moreover, in an other examination control values for the ACTH stimulation were registered and in addition the reproducability of this test was investigated. The results of the examinations and investigations confirm the necessity of taking precision and normal values determined in the own laboratory as basis for the interpretation of radiochemical substrate analyses.

34532 (INIS-mf—7451) **Reliability and accuracy of mammography in the diagnosis of breast carcinomas.** Krause, R. (Tuebingen Univ. (Germany, F.R.). Medizinische Fakultaet). 1981. 57p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780453.

Thesis.

On the basis of 417 histologically verified cases, 150 of which were breast carcinomas, accuracy of mammography in tumor diagnostics is determined. The degree of reliability of roentgenologic diagnosis is deduced from the analysis of all mammographies carried out during three years. 85% of all carcinomas were detected with a reliability degree of 50%. 10% of all carcinomas presented in the X-ray image not clearly defined findings. Including these cases, the degree of reliability was reduced to 14%; however, the degree of accuracy increased to 95%. The minor significance of additional roentgenographic examinations) for the diagnosis of the carcinomas presented in this study series, are discussed briefly. The incidence and reliability of malignity criteria are investigated and the reasons for the false diagnoses are explained.

34533 (INIS-mf—7455) **Design and testing of the measuring equipment for the detection of ^{71}Ge and ^{69}Ge within the gallium-solar-neutrino experiment.** Huebner, M. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftliche Gesamtfakultaet). 1980. 54p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780477.

Thesis.

A low level measuring system has been developed for the Ga-solar-neutrino experiment, to detect the reaction ^{71}Ga (νsub(e),e$^-$) ^{71} Ge by the decay ^{71}Ge (Tsub(1/2) = 11. 4 d, 100% electron capture). An estimate based on the solar standard model gives 15 ^{71}Ge atoms produced by solar neutrinos (pp and pep). As a monitor for background reactions in the target, the detectability of the ^{69}Ga (p,n) ^{69}Ge reaction by the decay ^{69}Ge (Tsub(1/2) = 39 h, 37% β^+-decay, 63% electron capture) has been considered. To test the system, the detectors are mounted in a low level laboratory lead box.

34534 (INIS-mf—7459) **Experimentals on the energy-deposition of fast neutrons in phantoms.** Maier, E. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik). 13 Dec 1978. 118p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780479.

Thesis.

The relative neutron sensitivities of a tissue-equivalent chamber and a carbon chamber with correction factors are given for four neutron energies and a ^{252}Cf-source. The necessary experimental and technical conditions for an application of the multi-detector mixed-field dosimetry with proportional counters are presented. The corrections accounting for charge recombination or the intensity decrease due to the chamber well are put on a theoretical basis.

34535 (INIS-mf—7473) **Study of cerebral metastases by means of computerized tomography.** Suwito, S. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Humanmedizin). 15 Aug 1980. 56p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780454.

Thesis.

Of all types of brain tumors, metastases are the most frequent. The most valuable method of examination today is computerized tomography as it provides ample information and involves no discomfort to the patient. The CT picture of metastases is often quite typical so that CT diagnosis will be sufficient in most cases. In some cases, also cerebral angiography is carried out for a differential diagnosis, or in case of a definite CT diagnosis, for supplementary information before surgical treatment. (MG).

34536 (INIS-SU—125, pp 533) **Emission spectrum of a positron source on the base of ^{22}Na.** Arifov, P.U.; Grupper, A.R. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34537 (INIS-SU—125, pp 375) **Device for study on the (p, pn) reactions.** Pasechnik, M.V.; Shostak, V.B.; Badovskij, V.P.; Palkin, G.P.; Khoromanskij, S.M.; Likhachev, V.P. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34538 (INIS-SU—125, pp 513) **X-ray fluorescence analysis using crystal-diffraction spectrometer with proton excitation.** Andrienko, V.B.; Anisovich, K.V.; Dyumin, A.N.; Kuz'min, V.M.; Lebedev, V.M.; Litinskij, A.V.; Safonov, L.A. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34539 (INIS-SU—125, pp 519) **Statistically optimal evaluation of decay constant using the data of measurements with low background noise.** Sotnikov, V.V.; Gopych, P.M. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34540 (INIS-SU—125, pp 556) **Comparison of some computerized methods for gamma spectra interpretation.** Stolyarova, E.L.; Novikov, A.I.; Srapenyants, R.A. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34541 (INIS-SU—125, pp 267) **Investigation of the Moessbauer spectrum shape on coherent acoustic excitation.** Kokh, R.; Realo, Eh. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34542 (INIS-SU—125, pp 526) **Moessbauer spectra processing by the method of distribution function reconstruction by means of quadrupolar splitting.** Zajtsev, M.G.; Klyukin, A.B.; Mokrushin, A.D.; Blokhin, V.F. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01. (CONF-820391—Summ.).

From 32. conference on nuclear spectroscopy and nuclear structure; Kiev, Ukrainian SSR (16 Mar 1982).

34543 (LBL—14986, pp 4-5) **Positron imaging studies in Alzheimer-type dementia.** Friedland, R.P.; Budinger, T.F.; Yano, Y.; Huesman, R.H.; Mathis, C.A.; Moyer, B.R.; Koss, B.; Ober, B. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Demented subjects are being studied with PET using the Donner Laboratory 280-crystal ring with a glucose analogue labeled with fluorine-18, (18-fluoro-2-deoxy-D-glucose, synthetized at the Lawrence Berkeley Laboratory's 88-inch Cyclotron and the

University of California at Davis Crocker Cyclotron). This provides for assessment of glucose metabolism and quantitation of alterations in crucial aspects of brain work associated with these illnesses. As glucose is by far the most important energy source for neurons, the rates at which brain regions use glucose is directly related to their levels of activity, and it has been extensively documented in animal and human studies that mental activities are reflected in brain metabolism.

34544 (LBL—14986, pp 5-8) **Radionuclide generators and cyclotron produced positron emitters for synthesis of biochemical substrates.** Yano, Y.; Budinger, T.F.; Mathis, C.A. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The production of positron emitters from radioisotope generators and from the LBL 88-inch cyclotron is discussed. The diagnostic uses of the $^{82}Sr/^{82}Rb$, $^{68}Ge/^{68}Ga$, $^{122}Xe/^{121}I$, and $^{122}Ba/^{128}Cs$ generators are discussed. Carbon-11 and Fluorine-18 were produced from the cyclotron for the synthesis of ^{11}C-methyl methionine, ^{11}C-palmitic acid, and ^{18}F-fluoro-2-deoxy-glucose. (KRM)

34545 (LBL—14986, pp 9-10) **New blood flow radiopharmaceutical.** Sargent, T. III; Shulgin, A.T.; Mathis, C.A.; Budinger, T.F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Our program for research into the causes of mental disorders such as schizophrenia, manic depressive illness and senile dementia has led us to the development of a new radiopharmaceutical agent, IDNNA (4-iodo-2,5-dimethoxy-N,N-dimethylamphetamine). A series of some 15 different ^{131}I labeled molecules with various substitutions on the amine were synthesized and tested, and the uptake of the ^{131}I labeled conpounds in rats was measured. The dimethyl amine (IDNNA) had the best brain uptake and brain/blood ratio. When injected into a dog and scanned with a whole-body scanner, the uptake in the brain could be clearly seen and quantified. Plasma sampling at the same time showed that the maximum brain/blood ratio of 8.7 occurred at 8 min after injection, and the concentration in brain remained high for at least 15 min. Labeling is achieved by reacting ^{131}ICl and the precursor, 2,5-dimethoxy-N,N-dimethyl amphetamine, in glacial acetic acid; the reaction is complete in less than one minute.

34546 (LBL—14986, pp 10-12) **Improved sampling in positron emission tomography.** Huesman, R.H.; Derenzo, S.E.; Budinger, T.F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The biomedical research performed with the Donner 280-Crystal Positron Tomograph requires data acquisition times of five seconds or less and the ability to gate the data acquisition for periods during the cardiac cycle when the heart is nearly at rest. These requirements pose severe restrictions on the amount of detector movement and have motivated the search for a scheme that improves lateral sampling with a minimum number of detector positions. A new approach, developed by our group, involves only two positions of the detector assembly and increases lateral sampling uniformly by a factor of two. This new approach is referred as clamshell sampling. To test clamshell sampling we performed Monte Carlo computer simulations of data acquisition with the new geometry. Hot spots of varying sizes and separation comprise the model used in a geometry scaled to test imaging the human head with the Donner 280-Crystal Positron Tomograph.

34547 (LBL—14986, pp 23-25) **Stereotactic heavy-ion irradiation of intracranial vascular disorders.** Fabrikant, J.I.; Hosobuchi, Y.; Lyman, J.T. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The development of precision microneurosurgical techniques has made the surgical removal of certain components of deep arteriovenous malformations located in previously inaccessible areas of the brain more feasible, with acceptable rates of surgical morbidity and mortality. However, there are still many deep intracranial vascular disorders that are not surgically accessible either because they are located deep within the critical brain structures or because of their enormous size involving considerable regions of normal or ischemic brain tissue. In treating this particular group of deep intracranial arteriovenous malformations, we are applying sterotactically-directed focal beams of charged particles for direct heavy-ion Bragg peak radiosurgery, or combining intraluminal embolization, surgical occlusion of the arterial feeding vessels and/or partial excision of the lesion, with stereotactic radiosurgery. During the past 24 months, 22 patients with deep intracranial arteriovenous malformations have been treated with stereotactic charged-particle Bragg peak radiosurgery at the 184-inch Synchrocyclotron.

34548 (LBL—14986, pp 75-76) **Treatment of cancer with heavy charged particles.** Castro, J.R.; Saunders, W.M.; Chen, G.T.Y. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

This project has been granted continuing National Cancer Institute support from July 1982 through July 1987, which together with DOE support should permit continued exploration of the role of heavy charged particles in clinical cancer care. The Northern California Oncology Group and the Radiation Therapy Oncology group together with the Bay Area Heavy Ion Association will continue to provide support for protocol design and implementation, patient referral, data collection and analysis, and statistical services for the cinical trial. Continued patient accrual during the past year has included irradiation with helium ions at the 184-Inch Cyclotron (342 patients) and irradiation with heavy particles at the Bevalac (119 patients).

34549 (LBL—14986, pp 77-80) **Radiotherapy physics.** Chen, G.T.Y.; Collier, J.M.; Pitluck, S.; Richards, T. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The Radiotherapy Physics Group is involved in clinical physics in support of the heavy ion radiotherapy program. Activities include research and development in the technical aspects of optimal heavy charged particle therapy, and clinical physics service for patients under treatment. Highlights of these activities during the past year are described.

34550 (LBL—14986, pp 80-84) **Heavy-ion radiography.** Fabrikant, J.I.; Tobias, C.A.; Holley, W.R.; Benton, E.V.; Woodruff, K.H.; MacFarland, E.W. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

High energy, heavy-ion beams offer superior discrimination of tissue electron densities at very low radiation doses. This characteristic has potential for diagnostic medical imaging of neoplasms arising in the soft tissues and organs because it can detect smaller inhomogeneities than x rays. Heavy-ion imaging may also increase the accuracy of cancer radiotherapy planning involving use of accelerated charged particles. In the current physics research program of passive heavy-ion imaging, critical modulation transfer function tests are being carried out in heavy-ion projection radiography and heavy-ion computerized tomography. The research goal is to improve the heavy-ion imaging method until it reaches the limits of its theoretical resolution defined by range straggling, multiple scattering, and other factors involved in the beam quality characteristics. Clinical uses of the imaging method include the application of heavy-ion computerized tomography to heavy-ion radiotherapy planning, to the study of brain tumors and other structures of the head, and to low-dose heavy-ion projection mammography, particularly for women with dense breasts where other methods of diagnosis fail. The ions used are primarily 300 to 570 MeV/amu carbon and neon ions accelerated at the Lawrence Berkeley Laboratory Bevalac.

34551 (LBL—14986, pp 84-86) **Diagnostic studies with high energy radioactive beams.** Chatterjee, A.; Saunders, W.M.; Scherer, J.S.; Alpen, E.L.; Llacer, J.; Chen, G.T.Y. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The objective of the present research is to obtain a better accuracy than provided by the CAT scanning method. Such an accuracy can be attained by using high energy beams of radioactive nuclei that decay by positron emission at the stopping point of the beam. Hence by detecting the positron-annihilated γ-rays in coincidence mode (using a suitable positron camera), the range-energy relationship in a heterogeneous object, such as in a patient, can be determined with 1-mm accuracy. The purpose of the proposed

work is to develop this idea in a practical way and demonstrate its usefulness in the treatment of cancer patients.

34552 (LBL—14986, pp 137-138) **Apolipoprotein E in umbilical cord blood plasma.** Forte, T.M.; Davis, P.A.; Blum, C.B. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Adolipoprotein E (apo E), with a molecular weight of approximately 37,000 daltons, is a minor apolipoprotein constituent in adult plasma lipoproteins. This apolipoprotein, like apolipoprotein B, is a ligand recognized by specific lipoprotein receptor sites (B-E receptors) on cell surfaces. We have recently shown that a pronounced apo E band appears in umbilical cord blood low-density (LDL) lipoproteins and also in high density (HDL) lipoproteins. Densitometric scans of Coomassie blue G-250 stained polyacrylamide gels suggested that apo E was probably elevated in cord blood lipoproteins. To pursue this suggestion, apo E in cord blood was quantitated by radioimmunoassay and correlated with cord blood lipid levels. In addition, apo E levels in 20 normal adult volunteers were also examined.

34553 (PB—82-922811) **Treatment of bladder cancer. Oncology overview.** (National Cancer Inst., Bethesda, MD (USA). International Cancer Research Data Bank). Oct 1982. 87p. NTIS, PC $6.00/MF$3.00.

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Surgical treatment of common bladder cancers; Radiation therapy of common bladder cancers; Chemotherapy of common bladder cancers; Immunotherapy of common bladder cancers; Multimodal treatment of common bladder cancers; Other treatment modalities of common bladder cancers; Treatment of less common bladder cancers; Reviews of treatment of bladder cancers.

34554 (PB—83-134221) **Role of the standards laboratory in brachytherapy. Final report.** Loevinger, R. (National Bureau of Standards, Washington, DC (USA)). 1981. 10p. Pub. in Proceedings of Recent Advances in Brachtherapy Physics, Strubridge, MA., October 5-6, 1979, p22-31 1981.

The role of the standards laboratory in the medical use of brachytherapy (interstitial) sources is to provide access to the International Measurement System by providing calibration against verified national dosimetry standards. It is proposed that in the United States clinical brachytherapy sources shall be calibrated by comparison with sources of the same kind that have been calibrated at the National Bureau of Standards in terms of exposure rate at one meter in air. It is argued that the quantities activity, exposure-rate constant, and equivalent mass of radium are unnecessary in brachytherapy dosimetry, and for reasons of accuracy and economy of effort should be eliminated in favor of exposure rate at one meter in air.

34555 (PB—83-937600) **Cancer deteCTion and management: nuclear medicine. Cancergram ct02.** (National Cancer Inst., Bethesda, MD (USA). International Cancer Research Data Bank). 1983. 12 issuesp. Paper copy available on subscription, North American Continent price $30.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the clinical use of radionuclides or nuclear medicine techniques in the care of cancer patients. It also includes any preclinical studies of various radionuclides or techniques considered to have direct clinical diagnostic relevance. Other basic biologic, pharmacologic, or metabolic studies where radionuclides are used as tracers will generally be excluded. Radiotherapy is covered by Cancergram CT15, and Diagnostic Radiology by Cancergram CT14.

34556 **Expectation values for low-resolution slit-scan flow prescreening: influence of nuclear shape and DNA density.** Mullaney, P.F.; Mann, R.; Seger, G.H.; Achatz, M. *Analytical and Quantitative Cytology;* **25**: No. 2, 115-122(Jun 1982). Contract W-7405-ENG-26.

From Third international conference on automation of diagnostic cytology and cell image analysis; Neuherberg, West Germany (23 May 1980).

We conducted high-resolution fluorescent image analysis with mithramycin-stained cells from clinical gynecologic specimens. Features characteristic of the usual, low-resolution, one-dimensional, slit-scan flow cytometric measurements were extracted from 250 high-resolution nuclear images. In addition to the measurement of the usual parameters, nuclear ellpticity and DNA density (DNA per unit nuclear size) were also determined. Our preliminary results indicate that both of these features offer increasded discrimination. When nuclear shape was included as a global feature, at least 77% of the diagnostic cells could be distinguished from normal cells, with no overlap. Both features hold promise for improving the discrimination possible with flow cytometry.

34557 **Positron emission tomography: instrumentation perspectives.** Budinger, T.F.; Derenzo, S.E.; Huesman, R.H.; Cahoon, J.L. Berkeley, CA; University of California (1982). 11p. Contract AC03-76SF00098.

Current trends in positron tomography are toward instrumentation which will provide resolution finer than 7 mm FWHM and a sensitivity of 75,000 events per second, per transverse section, for 1 μCi per cm^3 of activity in a 20 cm diameter phantom. Multiple stationary layers of tightly packed crystals with widths of 6 mm or less in circular arrays can provide adequate sampling for thorax or heat PET devices. The major instrumentation problem is to achieve efficient optical coupling between crystals and photo detectors without a sacrifice of sensitivity. Sampling and coupling schemes, an analysis of the time-of-flight gains and aspects of data acquisition and display are presented.

34558 **Fast neutron radiotherapy: fundamental aspects and clinical results.** Broerse, J.J. (Radiobiological Institute TNO, Rijswijk, Netherlands). *NBS Special Publication (United States);* No. 594, 440-446(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Renewed applications of fast neutrons for clinical radiotherapy, were initiated by fundamental radiobiological findings. Studies of the responses of normal tissues and tumor systems after irradiation with fast neutrons has shown two essential differences with the effect after x-irradiation, notably a reduced oxygen effect and a reduced repair of sublethal damage. Furthermore wide variations in relative biological effectiveness had been observed for different tumors and normal tissues. The results of the clinical applications of fast neutron are promising for speific tumors. However, the studies have indicated the need for coordinated clinical trials on a national and international scale. To allow a direct evaluation of clinical results obtained at the different neutron radiotherapy centers it will be essential to optimize the delivery of the dose to the target volume and to determine the energy dissipation with a sufficient degree of precision and accuracy. The need for better dose distributions and further knowledge of nuclear data, including cross sections, will be exemplified.

5507 Microbiology

REFER ALSO TO CITATION(S) 33104, 33106, 33107, 33108, 33109, 33110, 33111, 33112, 33113, 33114, 33115, 33116, 33117, 33118, 33119, 33120, 33121, 33122, 33123, 33124, 33125, 33126, 33136, 33174, 33275, 34442, 34502, 34503, 34606

34559 (LBL—14986, pp 105-107) **Identification and partial purification of the error-prone repair gene products of bacteriophage T4.** Hosoda, J.; Moise, H. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Error-prone repair of bacteriophage T4 is mediated by at least three genes, uvsX, uvsY and uvsW. The observations linking these genes to an error-prone repair pathway are that mutant alleles of these genes typically exhibit decreased uv- and gamma-induced mutagenesis and increased sensitivity to uv- and gamma-induced inactivation. The authors were able to identify the uvsX and uvsY gene products by two-dimensional gel electrophoresis, and succeeded in their partial purification by gene 32 protein affinity gel chromatography.

34560 (LBL—14986, pp 125-127) **Anomolous inability of Rous sarcoma virus to cause tumors in avian embryos.** Dolberg, D.S.; Nesis, H.I.; Bissell, M.J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

One of the most important conclusions to emerge from the last 50 years of cancer research is that the progression of most cells or tissues from a normal phenotype to malignancy is a multistep process. Until recently, the major exception to this general pattern has been the malignancies caused by the acute C-type sarcoma viruses typified by Rous sarcoma virus (RSV). This virus causes a rapidly growing sarcomatous tumor in newborn chicks that is palpable within one week of inoculation. The authors have studied an avian RSV system in which infected cells appear to have undergone progression, but are not yet malignant. As early as 1912 Murphy and Rous reported that RSV failed to cause tumors in chicken embryos. This observation was expanded in a series of papers by Duran-Reynals and coworkers in the 1940s from which he concluded that RSV caused tumors only in second semester embryos and only in the extraembryonic membranes. However, he did find that the virus-caused multiple non-neoplastic lesions in various endothelial tissues resulted in local hemorrhaging. He designated these hemorrhagic lesions. The authors have repeated the findings of Duran-Reynals and put them in the context of the recent advances of RNA tumor virology.

34561 **Measure of Legionella penumophila activity in situ.** Fliermans, C.B. (E.I. du Pont de Nemours & Co., Aiken, SC); Soracco, R.J.; Pope, D.H. *Current Microbiology;* **6**: 89-94(1981). Contract AC09-76SR00001.

Detection of Legionella pneumophila by serogroup-specific fluorescent antibodies was combined with a tetrazolium dye (INT) to measure electron transport activity. The biological uptake and reduction of the INT dye was studied in pure cultures and in natural water samples with respect to temperature. Uptake was complete within 60 min. Controls inhibited with formaldehyde demonstrated little activity. Both the in vitro and in situ determinations suggested that the electron transport system of Legionella was active over a temperature range of 25 to 60°C.

34562 **Dynamics of cellular and extracellular cAmp in Anabaena flos-aquae (cyanophyta): intrinsic culture variability and correlation with metabolic variables.** Francko, D.A.; Wetzel, R.G. (Michigan State Univ., Hickory Corners). *Journal of Phycology;* **17**: 129-134(1981). Contract AC02-76EV01599.

The production and extracellular release of cyclic adenosine 3′:5′-monophosphate (cAMP) by the blue-green alga Anabaena flos-aquae (Lyngb.) Breb. varied greatly within and between active growth phase and stationary phase and under differing nutrient regimes. Enhanced cellular cAMP production was found in actively growing Anabaena inoculated into media deficient in nitrate or phosphate, or into fresh media containing non-limiting nutrient concentrations. In stationary phase Anabaena, but not actively growing cells, the concentrations of intracellular cAMP present in cells grown under a variety of nutrient regimes could be significantly correlated to [^{14}C]-bicarbonate uptake by an exponential relationship.

34563 **Method for preparing permanent mounts of phytoplankton for critical microscopy and cell counting.** Crumpton, W.G. (Univ. of California, Davis); Wetzel, R.G. *Limnology and Oceanography;* **26**: No. 5, 976-980(1981). Contract AC02-76EV01599.

A method is described for preparing permanent mounts of phytoplankton for critical microscopy and cell counting. Preserved phytoplankton are settled onto cover glasses (or slides), dehydrated by ethanol vapor substitution, and mounted in one of several ethanol-soluble resins. The resulting slides are permanent, quantitative, and of excellent optical quality. Resolution is very good and, with the appropriate resin, contrast is high enough to eliminate the need for phase shift or other contrast enhancement.

34564 **Nuclear controls: discussant's introduction.** Dutta, S.K. (Howard Univ., Washington, DC). pp 219-227 of Fungal spore. Vol. 3. New York, NY; Academic Press (1981).

Some general aspects of fungal spore morphogenesis such as evidence of nuclear controls using fungal spore developmental mutants, and notable examples of positive and negative controls of fungal genes are presented in this chapter. (RJC)

34565 **Gene level control.** Dutta, S.K.; Frederick, L.; Austin, W.L. (Howard Univ., Washington, DC). pp 229-254 of Fungal spore. Vol. 3. New York, NY; Academic Press (1981).

Gene regulation of fungal sporulation may be manifested in several identifiable ways. These ways include an ordering of biochemical events, the development and behavior of organelles, and the phenotypic expression of morphogenetic characters. Considerable attention has been given to the biochemical nature of gene expression during spore formation and germination. Less attention has been given to organelle genesis and behavior and the expression of morphogenetic characters. In this presentation recent information on biochemical and certain morphological aspects of gene regulation and the nature and behavior of fungal genes are reviewed.

5508 Morphology

REFER ALSO TO CITATION(S) 34514, 34515, 34522

5509 Pathology

REFER ALSO TO CITATION(S) 34477, 34483, 34516, 34518, 34523, 34528, 34529, 34532, 34535, 34560, 34561

34566 **Dark cells in human oral leukoplakias.** Klein-Szanto, A.J.P. (Oak Ridge National Lab., TN); Sega, M.; Banoczy, J.; Albrecht, M. *Journal of Oral Pathology;* **11**: 228-236(1982). Contract W-7405-ENG-26.

Dark basal keratinocytes, characterized by a strong affinity for basic dyes and by electron density of cytoplasm and nucleus, could be recognized in eleven oral leukoplakias. The percentage of dark cells was higher in the group comprising leukoplakias verrucosa, and erosiva (28% of the basal cells) than in the leukoplakia simplex group (10%). The presence of these cells is a good indicator of the degree of histological dysplasia and correlates well with the preneoplastic potential of these lesions.

5510 Physiological Systems

REFER ALSO TO CITATION(S) 34513, 34522, 34524, 34525

34567 **Use of serum progesterone levels to detect pregnancy in elk.** Weber, B.J. (Utah State Univ., Logan); Wolfe, M.L.; White, G.C. *Journal of Wildlife Management;* **46**: No. 3, 835-838(1982). Contract W-7405-ENG-36.

The objective of this investigation was to determine the reability of serum progesterone assays as a means for detecting pregnancy in elk (Cervus elaphus). The elk were trapped during February through April in the Jemez Mountains of New Mexico. Blood samples were set to Bio-Science Laboratories for projesterone analysis by radioimmunoassay. Levels of progesteron were highly variable within the pregnant and nonpregnant elk. (RJC)

34568 **Intestinal transport of sugar: the energetics of epithelial pump-leak systems.** Kimmich, G.A. (Univ. of Rochester, NY). pp 169-174 of Membranes and transport. Volume 2. New York, NY; Plenum Publishing Corporation (1982). Contract AC02-76EV03490.

Absorption of monosaccharides from dietary constituents to the circulatory system involves the sequential transfer of sugar molecules across two plasma membranes that function in series at opposite poles of the intestinal epithelium. Sugar is first accumulated in the epithelial cell by a concentrative Na^+-dependent pump system located in the mucosal boundary. The accumulated sugar can then be transferred to the circulatory system via a facilitated diffusion leak system located in the serosal cell boundary. In contrast, the energetics of epithelial sugar transport has usually been considered solely in terms of understanding the function of the mucosal Na^+-dependent transport system. There has been a tendency to evaluate the energetic requirements for this system as an independent entity without regard to the function of the serosal system. This tendency has led to a number of experimental enigmas during the past decade with consequent confusion regarding the energetics of intestinal sugar transport in particular, but of gradient-coupled transport systems in general. This short review is aimed at describing recent developments that identify the limitation of conventional approaches to epithelial transport energetics, and the necessity for full consideration of both pump and leak flux pathways.

34569 **Constant-flow ventilation of apneic dogs.** Lehnert, B.E.; Oberdoerster, G.; Slutsky, A.S. Philadelphia, PA; American Physiological Society (1982). vp. Contract AC02-76EV03490.

The adequacy of constant airway gas flow sustenance of arterial blood gas tensions was investigated in anesthetized-paralyzed mongrel dogs. Gas delivery was achieved via a main-stem bronchi cannulation system constructed of two polyethylene tubes bifurcating at the carina, which rested on the posterior surface of the trachea outside of an endotracheal tube positioned in the upper third of the trachea. Equal flows (total flow = Vin) of humidified air were delivered through each limb of the cannulation system at constant flow rates with Vin ranging from 8 to 28 l/min. Intratracheal pressures at these flows characteristically ranged from 0.1 to 1 cmH_2O. Arterial O_2 tension varied directly (Pa/sub O_2/ = 0.72 Vin + 74.6), and arterial CO_2 tension varied inversely (Pa/sub CO_2/ = -0.73 Vin + 51.2) with Vin during ambient gas, constant-flow ventilation (DFV). During prolonged CFV (>2h), no evidence of CO_2 accumulation or deterioration of Pa/sub O_2/ was observed. This study demonstrates that in apneic dogs normal blood gases can be achieved and maintained over prolonged periods with constant airway flow at low intratracheal pressures.

34570 **Chronon theory of circadian rhythm control.** Ehret, C.F. (Argonne National Lab., IL). pp 229-238 of Chronobiology: principles and applications to shifts in schedules. Scheving, L.E.; Halberg, F. (eds.). Rockville, MD; Sijthoff and Noordhoff International Publishers (1981). Contract W-31-109-ENG-38.

The chronon theory of circadian rhythm control attributes the circadian oscillation to a phylogenetically general and structurally fundamental regulatory property of eukaryotic gene-action systems: the organization of the genetic material into polygenic sequences or chronons that require about a day for a strictly programmed chronotypic series of gene products to appear. By virtue of their naturally selected fixed length and net transcription velocity, the chronons define the length of the period of infradian cells to the circadian; a chronon recycling component assures reinitiation of circadian cycles so long as infradian conditions persist.

5530 Agriculture And Food Technology

REFER ALSO TO CITATION(S) 33333, 34434, 34475

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 33195, 33195, 33247, 33248, 33249, 33250, 33251, 33251, 33739, 33761, 33762, 33763, 33766, 33766, 34195, 34431, 34478, 34494, 34504, 34558

34571 **(AD-A—121289/3) Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80.** Bauer, L. (Illinois Univ., Chicago (USA). Dept. of Medicinal Chemistry). Aug 1980. 14p. NTIS, PC A02/MF A01.

The synthesis of 1,3-di(2-aminoethyl)adamantane is described. Attempts to convert this diamine to the corresponding 1,3-bis-(2-mercaptomethylcarboxamidine)ethyl adamantane are delineated.

34572 **(CONF-820439—7) Endogenous retrovirus and radiation-induced leukemia in the RMF mouse.** Tennant, R.W.; Boone, L.R.; Lalley, P.; Yang, W.K. (National Inst. of Environmental Health Sciences, Research Triangle Park, NC (USA); Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 20p. NTIS, PC A02/MF A01. Order Number DE83012061.

From Symposium on genetic mechanisms of carcinogenesis; Gatlinburg, TN, USA (11 Apr 1982).

Portions are illegible in microfiche products.

The induction of myeloid leukemia in irradiated RFM/Un mice has been associated with retrovirus infection. However, two characteristics of this strain complicate efforts to define the role of the virus. This strain possesses only one inducible host range class of endogenous virus and a unique gene, in addition to the Fv-1/sup n/ locus, which specifically restricts exogenous infection by endogenous viruses. These characteristics possibly account for absence of recombinant viruses in this strain, even though virus is amply expressed during most of the animal's life span. We have examined further the distribution of retrovirus sequences and the chromosomal locus of the inducible virus in this strain. This report describes evidence for additional viral sequences in cells of a radiation-induced myeloid leukemia line and discusses the possible origin of these added copies.

34573 **(CONF-820594—2) Intrinsic factors that can affect sensitivity to chromosome-aberration induction.** Preston, R.J. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 19p. NTIS, PC A02/MF A01. Order Number DE83012099.

From Conference on individual susceptibility to genotoxic agents in the human population; Research Triangle Park, NC, USA (10 May 1982).

The paper addresses the question, are there individuals who are hypersensitive, or are more likely to be hypersensitive, to the induction of chromosome aberrations by radiation and chemicals. Lymphocytes of persons heterozygous for xeroderma pigmentosum, ataxia telangiectasia, and Fauconi's anemia were subjected to chemical and/or ionizing radiations to determine their sensitivity to chromosome aberration induction. In the majority of cases the sensitivity was intermediate between that of normal individuals and homozygotes for these genes. (ACR)

34574 **(DOE/EV/03286—22) Study of the molecular basis for radiation mutagenesis. Final progress report.** Wang, S.Y. (Johns Hopkins Univ., Baltimore, MD (USA). Dept. of Environmental Health Sciences). 1979. Contract AC02-76EV03286. 16p. NTIS, PC A02/MF A01. Order Number DE83012227.

Portions are illegible in microfiche products.

A novel approach has been taken to the study of radiobiological effects at the molecular level. This method is aimed at correlating a particular radiation product with its biological effect. The investigation involved four stages: (1) separation, isolation and characterization of the radiation products of nucleic acid components; (2) methods for synthesis of these products to allow sufficient quan-

tities for stages 3 and 4; (3) examination of the biological effects of the radiation products in vivo and in vitro; and (4) study of the molecular mechanisms related to an observed biological effect.

34575 **(GSF-BPT—5/82) Biological effects of UV-B radiation.** Caldwell, M.M.; Tevini, M.; Worrest, R.C.; Bauer, H. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Bereich Projekttraegerschaften). Jun 1982. 231p. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In 27 papers the biological radiation effects of Ultraviolet Radiation in plants are described. Only one document contains some aspects of tumor induction by Ultraviolet Radiation. The aim was to investigate the growth stimulating or inhibiting effect of UV-Radiation under ecological conditions.

34576 (GSF-BPT—5/82, pp 28-32) **UV action spectra for mammalian systems: their implications for the predicted effects of ozone depletion of skin cancer incidence.** Setlow, R.B. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

A reasonable first step in the evaluation of the biological effects of UV-B radiation and of depletion of stratospheric ozone is to assume that cellular DNA is the most-important target. Recent experimental work has concentrated to obtain action spectra for vertebrate cells for a number of different endpoints. If skin cancer arises from the effects of UV-B on DNA, the action spectrum must be multiplied by the appropriate transmission spectrum of the skin. A 1% change in ozone will result in an approximate 2.3% change in UV damage corresponding to a DNA action spectrum. Data on the incidence of non-melanoma skin cancer in the USA show clear trends as a function of latitude or UV-B exposure. A prediction of the change of incidence as a function of ozone concentration must consider the many variables involved. The National Research Council report 1982 presents two calculations of the effects of ozone depletion on skin cancer incidence, which are presented and discussed.

34577 (GSF-BPT—5/82, pp 38-40) **Choice of the normalization wavelength for action spectra in polychromatic radiation dosimetry of UV-B.** Rupert, C.S. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

34578 (GSF-BPT—5/82, pp 41-48) **Microorganisms as dosimeter for solar UV-radiation.** Mennigmann, H.D. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

34579 (GSF-BPT—5/82, pp 49-55) **Wavelength dependence of inactivation and mutagenesis in a eucaryotic model system.** Zoelzer, F.; Kiefer, J. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In this study, forward mutations to canavanine resistance were examined. They depend on a single gene of about 8000 nucleotides. The role of excision repair can be investigated with accordingly deficient mutants. The nature of potentially lethal and premutational lesions can be inferred from photoreactivation studies.

34580 (GSF-BPT—5/82, pp 56-62) **Influence of induced recovery processes on the response of cells to UV radiation.** Rupert, C.S.; Hoy, C.A. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Preconfluent PtK-2 cells exposed to strong daylight flourescent illumination - either on the culture dish or suspended in balanced salt solution - show curious inactivation kinetics. Colony-forming survival at first declines to a minimum value, and then, with continued exposure, increases again to nearly its original value, as though longer exposure equips cells to deal better with the radiation damage. Investigation with cut-off filters shows that the shorter wavelengths from the lamp (< 340 nm) are responsible for approx.= 90% of the initial inactivation, but monochromatic irradiation at 313 nm, 334 nm or 366 nm produces only inactivation (successively weaker for longer wavelengths). The observed response therefore cannot be merely the sum of the responses to single wavelengths.

34581 (GSF-BPT—5/82, pp 93-102) **Some effects of enhanced UV-B radiation on surface lipids of Cucumis sativus cotyledons.** Steinmueller, D.; Tevini, M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Total wax extracts of cucumber cotyledons show practically no absorption within the UV-A and UB-B region. The absorption maximum was measured about to at 208 nm, which is the same for purified alkanes, waxesters etc. But due to a very rough pattern and crystalline surface structures, the often called wax bloom has high capability of light reflectance and light scattering, especially in the UV region. The small reflectance of leaves with damaged or removed wax sheets is connected with a rise of absorbed energy.

34582 (GSF-BPT—5/82, pp 110-116) **Effect of UV irradiation on the primary processes of photosynthesis.** Renger, G.; Graeber, P.; Dohnt, G.; Hagemann, R.; Weiss, W.; Voss, R. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In the paper presented, the effect of UV irradiation on the primary processes of photosynthesis is investigated. The aim of this work was to localize the functional components of the electron transport which are UV-sensitive.

34583 (GSF-BPT—5/82, pp 121-131) **Effect of enhanced UV-B radiation on photosynthetic activity of barley seedlings and chloroplasts.** Iwanzik, W.; Tevini, M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The purpose of the study was to investigate the action of UV-B on photosynthetic activity and on possible alterations of pigment and quinone composition of leaves and chloroplasts as suggested earlier from results on chloroplasts (Lichtenthaler and Tevini 1969) and on plants irradiated with different UV-B irradiation levels which showed reduced contents of chlorophylls and carotenoids.

34584 (GSF-BPT—5/82, pp 216-219) **Role of DNA breakage in bacterial lethality caused by UV-B radiation.** Peak, M.J. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The results constitute strong evidence that DNA backbone scissions may be important lethal lesions caused by UV-A, and thus possibly UV-B. There is no such evidence available supporting a role of SSB's in mutagenic events caused by SSB's due to UV-B and UV-A.

34585 **(IAEA-SM—266/24) Non-stochastic effects of ^{226}Ra and ^{228}Ra in the human skeleton.** Keane, A.T.; Kirsh, I.E.; Lucas, H.F.; Schlenker, R.A.; Stehney, A.F. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 34p. (CONF-830450—2). NTIS, PC A03/MF A01. Order Number DE83011711.

From IAEA/WHO symposium on biological effects of low level radiation; Venice, Italy (11 Apr 1983).

Results are reported of a comparative evaluation of the non-neoplastic changes that have been observed radiographically in the bones of two groups of former radium dial workers, one comprised of 201 women exposed predominantly to ^{226}Ra and the other comprised of 159 women exposed predominantly to ^{228}Ra at a median age of 18 yr. The characteristic changes range through progressively larger and more-frequent foci of both decreased and increased bone density (radiolucent and dense bone necrosis). Criteria developed in earlier studies were used to assign a numerical score to the changes seen in each individual. The score was used as a quantitative measure of bone necrosis. The long bones contributed the major portion of the total score for the skeleton, with the radii and ulnae showing the highest score on the basis of relative bone mass. The ribs and vertebrae, which account for 20% of the total bone mass, contributed $< 3\%$ of the total score. The appendages exhibited bilateral symmetry with respect to the changes. There is a broad correspondence between the score and the clinical impression of the degree of severity of the radiographic changes. Scores from 1/2 to 8 indicate minimal degree, from 8 1/2 to 16 mild degree, from 16 1/2 to 25 moderate degree, and > 25 advanced degree of severity. At intakes of either radium isotope below 10μCi, no changes above minimal were observed, and the mean score was used about the same as the mean of about 0.2 observed in a group of 120 matched control subjects. At intakes below 100 μCi, mean scores per yr post exposure were predicted by 0.0016 I, where I is the systemic intake in μCi, mean scores per yr post exposure were predicted by 0.0016 I, where I is the systemic intake in μCi of either ^{226}Ra or ^{228}Ra. For 50-yr ^{226}Ra or ^{228}Ra workers with annual systemic intakes at the ICRP limit of about 0.4 μCi, the predicted mean score at 50 yr is 1.0.

34586 **(INIS-mf—7545) REP Annual Report 1981.** (Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Radiobiologisch Inst. TNO; Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Inst. voor Experimentele Gerontologie; Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Primatencentrum). 1982. 325p. NTIS (US Sales Only), PC A14/MF A01. Order Number DE83780441.

Items within the scope of EDB have been entered individually into the data base. (ACR)

34587 (KFK-PTWT—1, pp 44-47) **Disinfection of sewage sludge with gamma radiation.** May 1980. (In German). NTIS (US Sales Only), PC A05/MF A01.

In Treatment of waste water and sewage sludge - research promoted by the BMFT.

In the Geiselbullach sewage treatment plant near Munich, sewage irradiation by a ^{60}Co source is being investigated on a technical scale. 145 m^3 of sewage sludge are irradiated per day and then used as field fertilizer.

34588 **(KFK-PTWT—1) Treatment of waste water and sewage sludge - research promoted by the BMFT.** (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). May 1980. 79p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780620.

Items within the scope of EDB have been entered individually into the data base. (ACR)

34589 (LBL—14986, pp 14-16) **Donner Clinic: kinetics of megakaryocyte and platelet turnover.** Ebbe, S.; Adrados, C.; Allan, C.; Barghe-Sharghi, V.; Carpenter, D.; Cohen, R.; Garbutt, P.; Londe, H.; Lum, C.; Phalen, E. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The hematology program of the Research Medicine Group incorporates the Donner Clinic, a laboratory for research on blood platelet production, and a research training program in cooperation with investigators in other groups. The emphasis in the research programs is on evaluation of the regulation of platelet and red cell production. Medical care is provided to patients with hematological diseases in the Donner Clinic. These patients also serve as a research resource. The majority of them have erythrocytosis (too many red blood cells), and, with their cooperation and informed consent, studies are underway to test their erythropoietin (Ep) response to therapeutic phlebotomy and mild perturbation of acid-base balance.

34590 (LBL—14986, pp 20-21) **Nuclear magnetic resonance programs at Lawrence Berkeley Laboratory.** Richards, T.; Budinger, T.F.; Nunlist, R. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

For over 30 years, chemists have used nuclear magnetic resonance (NMR) to derive chemical structure and behavior of molecules, but recently NMR has been used by radiologists to investigate the interior of the body. This past year we began to study the potentials of proton and ^{13}C NMR for the investigatoin of heavy-ion radiation effects in the brain and evaluation of atherosclerosis.

34591 (LBL—14986, pp 25-26) **Radiation epidemiology.** Fabrikant, J.I.; Lyman, J.T.; Alpen, E.L. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The effect of latency periods on cancer risk estimation is under study in our laboratory. Insofar as cancer incidences and radiation doses are concerned, effort is made to ascertain these with the greatest reliability, although problems arise, particularly in attempts to reconstruct the events of exposure many years prevously. The matter of the long latent periods begs the important issue of how to project into the future the risk of cancer induced in individuals exposed at the present time, or depriving a projection model appropriate for predicting how induced cancers will express themselves in time following exposure. Two risk-projection models which are generally used by radiation epidemiologists are discussed.

34592 (LBL—14986, pp 49-51) **Radiation survival studies with cultured normal human mammary epithelial cells.** Yang, T.C.; Stampfer, M.R.; Smith, H.S. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Since most human cancers are of epithelial origin and since women exposed to x radiation showed a higher incidence of breast cancer than the nonexposed female population, it is important to know how normal epithelial cells respond to radiation. Recently we have developed techniques to grow normal human mammary epithelial cells in mass culture for 1 to 6 passages and in a highly efficient clonogenic assay. These technical advances have enabled us to study the radiation sensitivity of these cells. This report presents our recent experimental results with normal human mammary epithelial cells at second passage.

34593 (LBL—14986, pp 52-54) **Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells.** Yang, T.C.; Craise, L.M.; Howard, J.; Tobias, C.A. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The potential carcinogenic and mutagenic effects of energetic heavy ions, which are present in cosmic rays, are not well understood. In our laboratory, the effects of energetic heavy particles on somatic mutation and malignant transformation of mammalian cells are being studied to obtain quantitative information on the dose-response curves and RBE values for heavy ions with various energies and LETs, to determine the kinetics and nature of potential transformation damage repair, and to understand the fundamental mechanism(s) of neoplastic cell transformation by heavy ions. The present report describes experimental results we have obtained with high energy silicon ions accelerated at the Bevalac.

34594 (LBL—14986, pp 55-62) **Cellular and molecular radiobiology of heavy-ion beams.** Tobias, C.A.; Blakely, E.A.; Roots, R.J.; Yang, T.C.H.; Chang, P.Y.; Lommel, L.; Craise, L.M.; Yezzi, M.J.; Martin, P.M. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The role of the cellular and molecular radiobiology group is to develop a fundamental understanding of the manner in which heavy ions exert their effects on biological systems, to apply our knowledge for a rational approach to therapy with heavy ions, and to quantitate the dose-effect relationships for acute and chronic ef-

fects in order to assure safe treatments. Specific aspects of cell injury produced by radiation lesions, and cell injury at different phases of the cell division cycle are being investigated.

34595 (LBL—14986, pp 62-63) **Ideas on the unification of radiobiological theories.** Curtis, S.B. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

A formulation of cell inactivation has been developed that incorporates several of the major ideas of past and present hypotheses of how individual mammalian cells are inactivated or rendered nonclonogenic by ionizing radiation. Elements from the repair-misrepair, lethal-potentially lethal, sublesion interaction, and tract structure models are combined to produce a single set of mutually compatible hypotheses. This unified model can be used to explain shoulders on survival curves, the exponential behavior both at low dose rates and at high LET, as well as to predict the kinetics of enzymatic cellular repair.

34596 (LBL—14986,.pp 63-65) **Cell age distribution in multicell tumor spheroids.** Rodriguez, A.; Alpen, E.L.; DeGuzman, R.J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

During the past four years we have characterized the radiobiological response of multicell tumor spheroids (MTS) of a rat brain tumor cell line (9L). The studies have been done with x rays and accelerated heavy ions. The radiation survival of MTS cells is enhanced compared to monolayer cells for low LET radiation. With heavy-ion radiation the enhanced survival of MTS cells is reduced, and at an LET between 70 to 80 keV/μm there are no differences in survival between monolayer and MTS cells. The RBE-LET relationship of MTS is similar to normal tissues.

34597 (LBL—14986, pp 65-67) **Induction of Harderian gland tumors in mice by heavy ion irradiation.** Alpen, E.L.; Powers-Risius, P.; Fry, R.J.M.; Ainsworth, E.J.; DeGuzman, R.J.; Harrison, L.D.; Havens, V.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

This project was undertaken as part of the program to evaluate the biological effects of charged particle beams generated by the LBL Bevelac and 184-Inch Synchrocyclotron. Experiments have been designed to investigate the relationship of LET to the effectivenesss of radiation of different qualities to induce tumors; and to study the factors that may influence the shape of the dose-response curve for cancer induction by high-LET radiation. The Harderian gland in mice has been chosen as a model tumor system. Although the total number of cells in these glands is small and the natural incidence is low ($\sim$ 2.7%) they are reasonably susceptible to the induction of tumors by irradiation.

34598 (LBL—14986, pp 67-68) **Cataract production in mice by fractionated doses of ^{13}C particles or ^{60}Co gamma radiation.** Ainsworth, E.J.; Jose, J.G. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The objective of our study was to evaluate the sparing effects of long-term dose fractionation with high LET ^{13}C ions and ^{60}Co gamma radiation. Because cataract examinations could be performed nondestructively, mice dedicated to studies of life shortening and carcinogenic response to photons and heavy charged particles were available for study. The project's staffing was such that slit-lamp biomicroscopic examinations could be performed only on $CB6F_1$ male mice that received single or fractionated doses of 225 MeV/amu ^{13}C ions and animals that received a single or fractionated dose of ^{60}Co gamma radiation of 4.17 Gy. A total of 24 fractionated doses were administered weekly. Using a semiquantitative scoring system, the severity of cataract response was evaluated at three sample times following the single dose or first fractionated dose.

34599 (LBL—14986, pp 68-72) **Response of mouse marrow colony forming units (CFU-S) to heavy charged particles.** Ainsworth, E.J.; Mahlmann, L.J.; Prioleau, J.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

A fundamental objective of the Bevalac Biomedical Program is to characterize biological responses in relation to the physical properties of heavy charged particles. Information collected with a variety of biological systems should contribute to the exploitation of the unique properties of heavy charged particles for radiotherapy and other medical applications. Relationships between RBE for CFU-S killing and LET were the first questions addressed in our studies. The procedure used was to harvest bone marrow from the femurs of animals within two hours after total-body irradiation, preparation of appropriate aliquots, and injection of marrow suspensions into animals that had received a supralethal dose of ^{60}Co gamma radiation. Recipients of bone marrow transplants are sacrificed at 8 to 10 days, spleens excised and placed in an appropriate fixitive, and spleen colonies greater than 0.5 mm accounted with a dissecting microscope.

34600 (LBL—14986, pp 72-74) **Life-shortening effects of heavy charged particles: a status report.** Ainsworth, E.J.; Prioleau, J.C.; Mahlmann, L.J. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The purpose of this project is to test hypotheses on relationships between relative biological effectiveness (RBE) for life span shortening and linear energy transfer (LET). The approach is to determine the RBE for life shortening over a broad range of estimated dose-averaged LETs. Data collected from this pilot project using comparatively high doses will permit inferences concerning RBE-LET relationships for life shortening, and potentially, for tumorigenesis, in comparison with RBE-LET relationships for other short-term endpoints such as cell killing.

34601 (ONWI—431) **DACRIN: a computer program for calculating organ dose from acute or chronic radionuclide inhalation.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 188p. NTIS (US Sales Only), E08/MF A01. Order Number DE83011661.

Includes 1 sheet of 24x reduction microfiche.

DACRIN calculates effective radiation dose to the human respiratory tract and other organs resulting from the inhalation of radioactive aerosols. The computer program is based on a mathematical model for organ dose following the precepts of the ICRP Task Group on Lung Dynamics and a simple exponential model for retention of radionuclides by an organ of interest. Mathematical models describing atmospheric dispersion have also been included in the code. The application of the DACRIN code can be used for the purpose of evaluating inhalation doses resulting from either acute or chronic atmospheric releases of radionuclides.

34602 (PB—82-922916) **Excision repair of DNA damage. I. Enzymology and mechanisms of excision repair. Oncology overview.** (National Cancer Inst., Bethesda, MD (USA). International Cancer Research Data Bank). Oct 1982. 78p. NTIS, PC $6.00/MF$3.00.

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Specific mechanisms of excision of chemically modified bases; Specific mechanisms of excision of radiation-induced damage; Formation and excision of apurinic and apyridiminic sites; Repair processes in excision repair of DNA damage; Restoration of chromatin after excision repair; Other studies of excision repair; Intragenomic distribution of excision repair; Interrelationship of repair pathways; Reviews of enzymology and mechanisms of excision repair.

34603 (PB—83-127407) Health Hazards Evaluation Report No. HETA-81-055-954, Cotter Corporation, Canon City, Colorado. Thun, M.J.; Baker, D.B.; Smith, A.B.; Halperin, W. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Sep 1981. 53p. NTIS, PC A04/MF A01.

In October 1980, the National Institute for Occupational Safety and Health (NIOSH) was asked by the Oil, Chemical, and Atomic Workers International Union and its Local 2-844 to evaluate the health effects of exposure to uranium ore dust and to yellowcake at The Cotter Uranium Mill, Canon City, Colorado.

34604 (PB—83-132019) Ionizing radiation lab. Manual (584). (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Training and Manpower Development). Mar 1976. 164p. NTIS, PC A08/MF A01.

An introductory course designed for professional health personnel outlining the concepts of the radiological health field is presented. Topics include radiation sources, radiation detection instrumentation, and radiation control methods. The use of analytical instruments and survey techniques is stressed. The author concludes that this course should allow the student to identify a radiation source, select the proper instrument for evaluating the source, and recommend appropriate radiation control measures.

34605 DNA repair in a congeneic pair of mice with different longevities. Collier, I.E.; Popp, D.M.; Lee, W.H.; Regan, J.D. (Oak Ridge National Lab., TN). *Mechanisms of Ageing and Development;* **19**: 141-146(1982). Contract W-7405-ENG-26.

The rate of ultraviolet light (UV)-induced DNA excision repair was determined in embryonic cells derived from a congeneic pair of short-lived (C57BL/10.F) and long-lived (C57BL/10) mice. Excision repair was measured by both bromodeoxyuridine photolysis and arabinofuranosyl cytosine inhibition. No difference in rate of repair was observed between the two cell lines.

34606 Radiation-induced leukemogenesis in RFM/UN strain mice: a potential model for retrovirus sequence transposition. Tennant, R.W. (Oak Ridge National Lab., TN); Hand, R.E. Jr.; Otten, J.A.; Liou, R.; Kiggans, J.O. Jr.; Yang, W.K.; Wang, T.W. pp 211-227 of Biological carcinogenesis. Rich, M.A.; Furmanski, P. (eds.). New York, NY; Marcel Dekker, Inc. (1982). Contract W-7405-ENG-26.

Analysis of various tissues from normal and tumor-bearing mice, including bone marrow, spleen, thymus, and embryonic cells, showed low-level expression of viral p 30 protein or an infectious type C virus. However, It was possible to cultivate and establish cell lines from embryonic tissues and adult thymuses that were virus-negative but which could be chemically induced to express retrovirus. In all cases, only ecotropic virus with N-tropic host range was detected, and the production of a similar virus was detected in transplantable myeloid leukemia cells. Virus isolates of RFM/Un endogenous origin showed good infectivity in most Fv-1/sup n/ cells such as NIH Swiss mouse embryo cells but were severely restricted in Fv-1/sub f/ cells, confirming the N-tropic host range; in addition, the replication of this RFM/Un endogenous N-tropic virus (RFV) was preferentially restricted in RFM/Un cells which are of the Fv-1/sup n/ genotype. The restriction of RFM/Un cells for RFV was analyzed at the stage of viral DNA formation by means of a modified Hirt extraction procedure and the electrophoresis/diazobenzyloxymethyl-paper transfer/molecular hybridization method; it was found that synthesis of both linear and covalently closed circular forms of viral DNA, either by RFV or by WN1802B B-tropic virus, was markedly inhibited in RFM/Un cells relative to that of Gross virus. Analysis by restriction endonuclease EcoR1 digestion demonstration that nuclear DNA of RFM/Un cells contained multiple copies of endogenous type C retroviral genes, including distinct retroviral sequence not found in NIH Swiss cells which never express endogenous ecotropic viruses. These results suggest that the RFM/Un mouse may possess only one inducible ecotropic host-range class of inducible virus and a unique gene, possibly an allele of the Fv-1 locus, which specifically restricts endogenous virus.

34607 Role of base damage in aberration formation: interaction of aphidicolin and x-rays. Bender, M.A. (Brookhaven National Lab., Upton, NY); Preston, R.J. pp 37-46 of Progress in mutation research. Vol. 4. Natarajan, A.T. (ed.). New York, NY; Elsevier Biomedical Press (1982). Contract W-7405-ENG-26;AC02-76CH00016.

Because both CA and APC are α polymerase inhibitors and because both interact synergistically with uv in the production of SCE, researchers have asked whether APC also shares other cytogenetic properties of CA, e.g., clastogenicity and synergism with ionizing radiation for induction of chromosomal aberrations in G_0 and in G_2 human peripheral lymphocytes. The results at hand are already sufficient to answer the questions: like CA, APC is clastogenic in both $G_0$0 and G_2, and it also interacts synergistically with x-rays to increase chromosomal aberration production in both G_0 and G_2.

34608 Plutonium movements across the haemochorial placenta of the guinea pig. Kelman, B.J.; Sikov, M.R. (Pacific Northwest Lab., Richland, WA). pp 319-326 of Placenta: receptors, pathology and toxicology. Miller, R.K.; Thiede, H.A. (eds.). Eastbourne, England; W.B. Saunders, Co. Ltd. (1981). Contract AC06-76RL01830.

In order to measure transplacental movements of plutonium without the complications of fetal accumulation, the fetal circulation of the guinea pig placenta (at 59 to 61 days of gestation) was perfused in situ. Dams were administered trace quantities of tritiated water (to indicate changes in maternal blood flow to the placenta) and 30 μCi/kg (i.e., approximately 500 μg/kg) of citrated ^{239}Pu by intravenous injection. Plutonium-239 doses were large, approaching the LD/sub 50/30) (20 to 80 μCi/kg) for other species. Perfusion pressure, maternal cardiac rate, electrocardiogram, blood pressure, and respiratory rate were monitored continuously during each perfusion. Our measurements show that the clearance of plutonium from mother to fetus is small - 2.5 +- 0.5 μl/min - an amount that is less than 20% of the clearance of inorganic mercury. The indirect measurements of maternal blood flow to the placenta indicate that placental blood flow is greatly diminished in dams dosed with plutonium, which may partially account for the low clearance of plutonium.

34609 Plutonium movements across the haemochorial of the guinea pig. Kelman, B.J.; Sikov, M.R. (Pacific Northwest Lab., Richland, WA). pp 319-326 of Placenta: receptors, pathology and toxicologyplacenta. Miller, R.K.; Thiede, H.A. (eds.). Sussex, England; W.B. Saunders Co., Ltd. (1981). Contract AC06-76RL01830.

In order to measure transplacental movements of plutonium without the complications of fetal accumulation, the fetal circulation of the guinea pig placenta was perfused in situ. Dams were administered trace quantities of tritiated water (to indicate changes in maternal blood flow to the placenta) and 30 μCi/kg of citrated ^{239}Pu by intravenous injection. Plutonium-239 doses were large, approaching the LD/sub 50/30/ for other species. Perfusion pressure, maternal cardiac rate, electrocardiogram, blood pressure, and respiratory rate were monitored continuously during each perfusion. Our measurements show that the clearance of plutonium from mother to fetus is small - less than 20 percent of the clearance of inorganic mercury. The indirect measurements of material blood flow to the placenta indicate that placental blood flow is greatly diminished in dams dosed with plutonium, which may partially account for the low clearance of plutonium.

5602 Thermal Effects

34610 (NP—3770069) Investigation on the stress of miners by dry and hot climatic conditions. Thien, K.D. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 25 Sep 1981. 141p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770069.

Portions are illegible in microfiche products; Thesis.

We know only little about the connection between the impact due to specific working- and climatic conditions and due to

the resulting stress. Therefore a field investigation was carried out on miners working underground. Within the frame of this investigation we measured the climatic factors dry temperature, humid temperature, weather velocity, also the course of work and the required activities particularly with respect to the energy consumption/transformation, and finally also the stress magnitudes heart rate and body temperature. Some data about the body were determined, preferably the performance of the examined miners, which in a large part of the test persons resulted to be relatively low. However, in many cases the reason for this finding has to be seen in the partly considerable overweight. Since we found only in single cases increased stress conditions for the miners, it was not possible to deduce from the realised field investigation any reasonable stress limits. However, when the particular marginal conditions were considered, the results agreed with the presently existing suggestions for such limit values.

34611 **Thermal resistance of juvenile crayfish, Cambarus bartoni (fabricius): experiment and model.** Cox, D.K.; Beauchamp, J.J. (Oak Ridge National Lab., TN). *American Midland Naturalist;* **108**: No. 1, 187-193(1982). Contract W-7405-ENG-26.

Juvenile crayfish, Cambarus bartoni, were subjected to acute thermal changes after being acclimated to temperatures of 15, 20 or 25 C for at least 1 week. Groups of 10 individuals each were exposed to various combinations of time and temperature, after which they were returned to their original acclimation temperature. Observations of latent mortality made 72 hr later indicated that some crayfish experience lethal temperature stress between 30 and 33 C; their ultimate upper incipient lethal temperature is estimated to be 32.5 C. A linear logistic model was used to construct contours of constant mortality (30, 50 and 90%) as a function of time and temperature.

5603 Chemicals Metabolism And Toxicity

REFER ALSO TO CITATION(S) 33060, 33100, 33152, 34403, 34404, 34409, 34439, 34479, 34500, 34573, 34574

34612 **(AD-A—121284/4) Chemical carcinogen (hydrazine et al.) induced carcinogenesis of human diploid cells in vitro. Annual progress report 1 Sep 81-31 Aug 82.** Milo, G. (Ohio State Univ. Research Foundation, Columbus (USA)). 7 Sep 1982. 102p. NTIS, PC A06/MF A01.

Polynuclear hydrocarbons or hydrazine analogues do not have an absolute requirement for binding to DNA in order to elicit a carcinogenic event. Furthermore, PNH like BP enter the nucleus via a lipoprotein complex where the BP is oxygenated and then interacts with the genetic material,(DNA). The adduct formed is 7 beta-BPEDI-dG. Benzamide does not alter the binding of the perceived ultimate carcinogen to dG but eliminates the carcinogenic response. The period of heightened response to the carcinogen appears to be 3 hours into S phase of the cell type. The modifying effect of TPA or Benzamide appears to alter the nuclear non-histone proteins protecting the cellular DNA.

34613 **(BMFT-FB-T—82-116) Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects.** Siebert, D. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1982. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750058.

Testing of chemicals for their genetic activity by applying only one method has the disadvantage, that the results are of limited value. However, a combination of several test systems in such a manner that the apparent difference between the results allows additional conclusions about the pharmacokinetic properties of the substances tested, the correlation between molecular mutations and cytogenetic effects and the possible carcinogenic activity. Three nitrofuran derivatives (nitrofurantoin, carofur and FANFT) tested in six different in vitro and in vivo mutagenicity tests partly showed strong genetic activity without metabolic activation and weak cytogenetic effects. However, polycyclic hydrocarbons needed mammalian metabolism to display their mutagenicity: Dimethylbenzoanthracene and benzo(a)pyrene could be activated by liver microsomes and showed also cytogenetic effects, but phenanthrene was only active in the SCE-test. Out of nine heavy metal salts potassium chromate, potassium dichromate, calcium chromate and cis-dichloro diammine-Pt(II) were effective in at least one genetic and one cytogenetic test. The correlation between mutagenic and the known carcinogenic activity of all test substances was good in the case of the hydrocarbons and the nitrofuran derivatives; the heavy metal salts, however, are of low relevance for the carcinogenicity of the metals itself.

34614 (CONF-820418—, pp 24-40) **Germination and growth effects of hexavalent chromium in Orocol TL (a corrosion inhibitor) on Phaseolus vulgaris.** Parr, P.D.; Taylor, F.G. Jr. (Oak Ridge National Lab., TN). Apr 1982. NTIS, PC A23/MF A01.

From UCC-ND and GAT environmental protection seminar; Gatlinburg, TN, USA (5 Apr 1982).

This research was designed to address the potential for germination and growth effects in bush beans (Phaseolus vulgaris L. var. Bush Blue Lake) from hexavalent chromium in Orocol TL, a proprietary chromated, zinc-phosphate compound added to DOE cooling water systems for corrosion inhibition. Studies were conducted at low and high Orocol TL concentrations in the soil by adjusting soil pH and the percent of organic matter. Germination effects were determined for seeds germinated in soils adjusted to differing pH ranges (4 to 4.5, 5 to 5.5, and 6.5-7), levels of organic matter (1.8, 3, and 5%), and Orocol TL amendments (control of 0, 10, and 500 μg/g chromium). Growth responses (effects) were determined from plants cultured in the same soil treatment combinations as described for the germination study. High levels (500 μg/g) of hexavalent chromium in soil (as Orocol TL) affected germination and growth, while a high level of organic matter significantly reduced chromium toxicity on germination. At lower chromium concentrations there was significant uptake by all plant parts, with a corresponding reduction in biomass of leaves. Consequently, adjustments of soil pH from 4.0 to 7.0 appear to have no significant effect on chromium uptake in plants. Increasing the organic matter level to 5%, while decreasing the toxicity of high chromium levels to germinating seed, did not affect chromium uptake.

34615 **(CONF-820448—5) Need to develop a short-term Chinese hamster in-vivo specific-locus mutational assay.** Hsie, A.W.; Schenley, R.L. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 21p. NTIS, PC A02/MF A01. Order Number DE83010719.

From Banbury conference on genotoxic indications of exposures in men; Cold Spring Harbor, NY, USA (18 Apr 1982).

Portions are illegible in microfiche products.

This paper summaries mutagenesis studies using Chinese hamster ovary (CHO) cells and briefly explains the use of CHO cells for studies of mutagenic effects at the cytogenetic level including mutagen-induced changes in DNA nucleotide sequences. The existence of a large data base on gene mutation, chromosome aberration, and sister chromatid exchange in cultured Chinese hamster cells argue favorably for the need to develop an in vivo assay system. Since CHO cells in vitro are incapable of converting promutagens to mutagenic forms except when coupled with a metabolic activation system, a short-term specific locus mutation assay in vivo using the Chinese hamster as a model animal is proposed. (ACR)

34616 **(CONF-8104202—1) Strain differences and solvent effects in mouse skin carcinogenesis experiments using carcinogens, tumor initiators, and promoters.** Slaga, T.J.; Fischer, S.M. (Oak Ridge National Lab., TN (USA)). 1981. Contract W-7405-ENG-26. 44p. NTIS, PC A03/MF A01. Order Number DE83010700.

From Workshop on skin painting technology for safety evaluation; Washington, DC, USA (28 Apr 1981).

Portions are illegible in microfiche products.

Skin tumors can be effectively induced in mice by the repetitive application of a carcinogen. The relative order of sensitivity to complete carcinogenesis is SENCAR > CD-1 > C57BL/6 > ICR/Ha Swiss ≧ C3H ≧ BALB/c. Skin tumors in mice can also be induced by the sequential application of a subthreshold dose of a carcinogen (initiation phase) followed by repetitive treatment with

a weak or noncarcinogenic tumor promoter (promotion phase). The relative order of sensitivity to initiation-promotion is SENCAR much greater than CD-1 > ICR/Ha Swiss > BALB/c ≧ C3H ≧ DBA/2. The initiation phase requires only a single application of a carcinogen and is essentially an irreversible step, while the promotion stage is initially reversible, later becoming irreversible. The relative sensitivities of the strains of mice to polycyclic aromatic hydrocarbons (PAH), phorbol esters, benzopyrene, and other tumor promoters is discussed. The effects of solvent and manner of administration of the carcinogen are also investigated. (ACR)

34617 (LA-UR—83-1151) **Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants.** Hildebrand, C.E.; Crawford, B.D.; Enger, M.D. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 14p. (CONF-830440—3). NTIS, PC A02/MF A01. Order Number DE83011139.

From UCLA symposia on molecular and cellular biology; Keystone, CO, USA (10 Apr 1983).

Cadmium-resistanc (Cd/sup r/) variants of the Chinese hamster cell line, CHO, have been derived by stepwise selection for growth in medium containing $CdCl_2$. These variants show coordinately increased production of both metallothionein (MT) I and II and were stably resistant to Cd^{2+} in the absence of continued selection. Genomic DNAs from these Cd/sup r/ sublines were analyzed for both MT gene copy number and MT gene organization, using cDNA sequence probes specific for each of the two Chinese hamster isometallothioneins. These analyses revealed coordinate amplification of MT I and II genes in all Cd/sup r/ variants which had increased copies of MT-encoding sequences. In situ hybridization of an MT-encoding probe to mitotic chromosomes of a Cd/sup r/ variant, which has amplified MT genes at least 14-fold, revealed a single chromosomal site of hybridization. These results suggest that the isoMTs constitute a functionally related gene cluster which amplifies coordinately in response to toxic metal stress.

34618 (LBL—14986, pp 28-29) **Thyroid hormone studies after ozone exposure.** Clemons, G.K.; Garcia, J.F. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Previous studies indicated that ozone exposure resulted in a profound depression of the pituitary-thyroid axis of rats even though all the elements of the hypothalamic-pituitary-thyroid system of ozone-exposed rats seemed capable of responding when appropriately stimulated. These studies which examine this response in more detail seem to indicate that the disappearance of thyroxine in the serum of thyroidectomized rats receiving replacement therapy cannot be accounted for by reduced water intake, but rather the disappearance may be due to some peripheral phenomenon initiated by ozone exposure. (KRM)

34619 (LBL—14986, pp 114-116) **Effect of chemical carcinogens on mammalian cells in culture.** Goth-Goldstein, R.; Hughes, M.; Tincknell, B.P. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

In recent years various structural alterations in DNA by chemical carcinogens have been identified and related to specific biological perturbations. Many of these modified DNA bases are removed by cellular repair systems. The ability to repair specific lesions varies depending on cell type, tissue and species and plays an important role in the cytoxic, mutagenic and carcinogenic effect of an agent. The authors are especially interested in defining the role of DNA repair on the action of alkylating agents such as N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) or methylnitrosourea (MNU). To quantify the toxic and mutagenic effects of these agents, they work with a simple mammalian cell system, a well established Chinese hamster ovary (CHO) cell line. Cell killing by an agent is determined by reduction in colony-forming ability, and its mutagenicity by testing for three different genetic markers, resistance to 6-thioguanine (6TG/sup r/), ouabain (OUA/sup r/) and diphtheria toxin (DT/sup r/).

34620 (LBL—14986, pp 116-118) **Carcinogenic potency.** Gold, L.S.; Ang, D.; Backman, G. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Efforts to use animal bioassays in the evaluation of the potential health risk of chemicals to humans have been hampered by the lack of a standardized method to compare experimental results. Experimental protocols as well as the type of information reported in the literature are quite diverse. Moreover, quantitative estimates of carcinogenic potency have not been applied to the results of tests on a broad range of chemicals. Our Carcinogenic Potency Database is an attempt to quantify and standardize the animal bioassay literature and to organize it systematically.

34621 (LBL—14986, pp 123) **In vitro transformation of human mammary epithelial cells.** Stampfer, M.R.; Bartley, J.C. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Studies to develop an assay to detect carcinogen-induced transformation in vitro have been initiated. Such an assay could be a valuable method of detecting environmental carcinogenic agents, as well as furthering our understanding of the mechanisms involved in malignant transformation. The development of this assay has been made possible by previous work in developing the human mammary cell culture system, in defining properties associated with tumor derived cells, and in demonstrating that these mammary cells can readily convert the procarcinogen, benzo(a)pyrene (BaP) to its carcinogenic product. We have utilized BaP for our initial studies since it is the most common environmental polutant in its class present in our atmosphere, and it and related compounds are known to readily induce mammary carcinoma in rodents.

34622 (LBL—14986, pp 124) **Benzo(a)pyrene metabolism in human mammary epithelial cells.** Bartley, J.C.; Stampfer, M.R. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The epithelial cells rapidly metabolize benzo(a)pyrene (BaP), a common environmental carcinogen produced during fossil fuel utilization, to a wide variety of products including the documented ultimate carcinogen, benzo(a)pyrene diolepoxide. The result of this metabolism is covalent bonding of the ultimate carcinogen to protein, RNA and DNA. The type and extent of DNA modification is comparable to that observed in cells transformable by treatment with BaP. A more extensive survey of BaP metabolism by epithelial cells grown out from 30 breast specimens, both normal and malignant, has revealed that, as expected, interindividual variation in BaP metabolism is greater than that observed in studies with cells from syngeneic animals, but not as great as that observed by others studying cancer prone human tissues in organ culture. The possibility that this interindividual variation is related to the familial risk of breast cancer is currently under investigation.

34623 (NP—3770101) **CO diffusion capacity.** Mielke, U. (Marburg Univ. (Germany, F.R.). Fachbereich Humanmedizin). 1979. 83p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770101.

Portions are illegible in microfiche products; Thesis.

We measured in 287 persons the pulmonary CO diffusion capacity with the steady-state and the single breath methods, applying apnoeic periods of 4 and 10 seconds duration. The aspects methodical significance, polyclinical applicability and pathognostic relevance with respect to other approved pulmonary functional tests are discussed. Differing pulmonary diffusion capacity values found in normal persons or in patients suffering from silicosis, pulmonary fibrosis, Boeck's disease or rheumatoid arthritis, were investigated and critically evaluated.

34624 (NP—3770102) **Subtoxic lead exposure of the albino rat during different phases of development and its effects on the open-field behaviour and the learning ability as studied by discrimination tests.** Terhoeven, P. (Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet). 1980. 112p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770102.

Portions are illegible in microfiche products; Thesis.

Female Wistar rats received a lead diet of 1.38 g lead acetate/kg food or a normal diet, respectively and after 54 days they were mated. The young rats were exposed to lead either only diaplacentally until birth or postnatally in infancy and as adult animals

by plumbiferous breast milk or diet, or pre- and postnatally until ablactation. At different instants we determined the blood-lead and the brain-lead levels, the d-aminolevulic acid dehydrase activity and the packed cell volume of the dams and the young animals. In addition the respective weight was registered. For the learning test the food was reduced to 80% of the individual food demand. In the open-field test we investigated the parameters ambulation, rearing, grooming and defaecation. Neither the dams nor the young rats showed any symptoms of lead intoxication. The weight before and during food deprivation did not present any group differences. In the lead-exposed dams and in the pre- and postnatally lead-exposed young rats the mean blood-lead level ranged between 25 and 31 μg/dl. In those animals exposed to lead postnatally, these concentrations were reached slowlier. The blood-lead level of those rats exposed to lead only prenatally or until ablactation had dropped to control values within some weeks. The brain-lead level of those animals exposed still after infancy, almost agreed with the corresponding blood-lead level. Whereas the packed cell volume did not reveal any group differences, the delta-aminolevulic acid dehydrase activity was found to be significantly reduced for those test animals, which underwent the longest lead exposure. The behaviour observed in the open-field tests did not reveal any significant group differences. Also with respect to the learning performance no differences between the groups of varying conditions could be found.

34625 (NP—3770103) Neurological aspects of mercury intoxication. Gundlach, P. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 1979. 90p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770103.

Portions are illegible in microfiche products; Thesis.

The present paper gives a detailed literary survey about mercury intoxication and the resulting neurologic effect on the peripheral and the central nervous system, under consideration of neuropsychiatric aspects. In the first part the occurrence of mercury in the human environment, possible pathways of uptake and its effects are described. Then the classic symptomatology of mercury intoxication as it is described by earlier authors, is discussed in the following chapters. It resulted that here general clinical symptoms and signs can be depicted, which may also occur with different other diseases. As a contrast, special clinical indications due to mercury intoxication are described. We tried to establish a relation to a morphologico-pathological substrate. It was found that the clinical symptomatology of a mercury intoxication can be put in connection with syndromes, for example: the polyneuropathic syndrome, the extrapyramidal tract syndrome, the extrapyramidal and the cerebellar syndromes.

34626 (NP—3770115) Neurological aspects of lead intoxication. Lehner, H. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 8 May 1980. 154p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770115.

Portions are illegible in microfiche products; Thesis.

This study gives a survey over the medical and scientific literature on lead intoxications, which were published until 1979. Neurologic aspects are of particular interest. At present dramatic cases of lead intoxications occur only rarely. However, there are numerous studies about cases of chronical, partly subclinical intoxications. This chronical type of lead intoxication can become manifest clinically as relatively vague symptoms, for example vertigos, insomnia, headaches and weakness. Contrary to this, serious encephalopathies, even with fatal outcome, and polyneuropathies with typical paresis of the radial nerve are preferably observed in acute lead intoxications. Besides the numerous sources of intoxication, also the different opinions found in literature are discussed, concerning the effects of lead on the human body. The fact that there are differing opinions about the limiting value of the blood-lead level at which intoxication symptoms have to be expected, becomes apparent when the determined blood-lead level values are compared and evaluated. Besides the description of general intoxication effects, the discussion of the neurologic aspects found in literature - not only those concerning the central, but also the peripheral system - are preferably concerned. Reports about neuropsychical alterations due to lead exposure, which are mainly found in children, supplement the numerous descriptions of the macroscopic and microscopic alterations of the nervous system provoked by lead. Finally the therapeutic and prophylactic measures given in the literature are discussed.

34627 (NP—3770116) Investigations of subclinical neurogenous damage of persons with chronic occupational exposure to lead and trichlorethylene. Reichenbach, T. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Medizin). 15 Dec 1980. 85p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770116.

Portions are illegible in microfiche products; Thesis.

The functions of the peripheral nervous system, for example the maximum and minimum conduction velocities of the ulnar and the radial nerves, were measured in 22 men and 9 women with occupational exposure to lead and in 20 men and 20 women without occupational exposure to lead. The result of the comparison of the obtained measuring values was a decrease of the minimum conduction velocity of the ulnar nerve of the working hand of men exposed to lead. In order to quantify the lead exposure we determined in all test persons the blood lead level, the concentration of free erythrocyteporphyrines in the blood and the hemoglobin concentration. The study reports also about the elcetroneurographic investigations on 7 persons with chronical exposure to trichloroethylene and on 13 comparable persons of a corresponding age group. A correlation between the biochemical and toxicologic parameters and the nervous conduction velocities could be detected neither in the persons exposed to lead nor in those exposed to trichloroethylene. The measured nervous conduction velocities are well comparable with those age-specific indications given in the specialised literature. The dependence of conduction velocity on various parameters as age, temperature, left- or righthandedness and sex is discussed.

34628 (PB—83-126433) Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon. Apol, A.G. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1981. 9p. NTIS, PC A02/MF A01.

In November 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from the Salem Area Family Counseling Service to determine the cause of the adverse health responses (headache, dizziness, irritation of the eyes and throat, dry and sore throat, fatigue, and lethargy) experienced by six of the seven employees in the office. NIOSH conducted an environmental survey on December 29-30, 1980. Due to the persistence of symptoms after the carpets and drapes were steamed cleaned, and the ventilation system cleaned, the firm relocated in another office building. Two months after relocation, the symptoms appeared to have disappeared.

34629 (PB—83-126458) Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania. Chrostek, W.J. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1981. 11p. NTIS, PC A02/MF A01.

On December 1, 1980, NIOSH received a request from the Director for Safety and Plant Protection at the Fischer and Porter Company for a Health Hazard Evaluation at their subsidiary, Lab-Crest Scientific Glass Company, Warminster, Pennsylvania. The request stated that two new ovens were installed for curing decals on glass tubes. Since these ovens were installed, the five employees were complaining of eye irritation and nasal problems. Samples of the decals were submitted to the NIOSH laboratory for analysis of their decomposition products. The major decomposition products of the decals were formaldehyde, acetaldehyde, propionaldehyde, n-butyraldehyde, n-valeraldehyde, styrene, and compounds of styrene. On the basis of the data obtained in this investigation, NIOSH determined that a hazard from overexposure to styrene did not exist under present working conditions. NIOSH recommends that engineering controls and stringent work practices be employed to reduce occupational exposures to formaldehyde to the lowest feasible limit.

34630 **(PB—83-127365) Health Hazard Evaluation Report No. HHA-80-238-931, new York Port Authority, Brooklyn, New York.** Baker, D.; Fannick, N. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1981. 19p. NTIS, PC A02/MF A01.

In August 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from the Carpenters Union, Local 1456, AFL-CIO, to evaluate coal tar creosote exposure among dock builders. Specifically, the request concerned six employees engaged in pile-driving creosote-preserved wood logs for a dock underpinning in Brooklyn, New York. NIOSH concluded that coal tar products, including creosote, are carcinogenic (have the potential to cause cancer). Inhalation of CTPVs may increase the risk of developing lung cancer. Direct skin contact with creosote causes acute irritation and can lead to the development of skin tumors, including skin cancer. Recommendations on personal protection and hygiene, respirator usage, and medical monitoring are presented.

34631 **(PB—83-130252) Effects of air pollution on airway function. Final report May 80-May 81.** Nadel, J.A.; Boushey, H.A.; Bethel, R.A.; Epstein, J.; Kirkpatric, M.B. (California Univ., San Francisco (USA). School of Medicine). May 1981. 19p. NTIS, PC A02/MF A01.

Asthmatic individuals can develop bronchoconstriction on brief exposure to levels of sulfur dioxide (SO2) observed in urban air. In these studies conducted at rest, asthmatics breathing 1 and 3 ppm SO2 developed significant bronchoconstriction; whereas nonasthmatic subjects developed bronchoconstriction only after breathing 5 ppm. Exercise potentiates this response in asthmatics: exposure to SO2 for 10 minutes while performing light to moderate exercise caused bronchospasms at 0.5 and 0.25 ppm. Bronchoconstriction during light exercise caused by SO2 is less with oronasal breathing (facemask) when compared to oral breathing (mouthpiece). At higher levels of exercise the protection of oronasal breathing is lost probably because more air is taken in through the mouth as ventilation increases.

34632 **(PB—83-132001) Guidelines for recirculation on exhaust air. Technical report.** Hughes, R.T.; Amendola, A.A. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Surveillance, Hazard Evaluation and Field Studies). Nov 1980. 17p. NTIS, PC A02/MF A01.

The use of exhaust air recirculation to conserve energy was analyzed. Recirculation decision logic, design and assessment, worker exposure, and system evaluation were outlined. Recirculation without premixing, air recirculation system monitoring, and recirculation air bypass were described. Costs, safe exposure concentrations, dilution, monitoring devices, systems flexibility, airflow rates and patterns, ventilation, and air cleaner efficiency calculations were discussed. The authors conclude that adherence to these guidelines is necessary, and caution that if the air contains human carcinogens, recirculation should not be attempted.

34633 **(PB—83-133249) Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods.** Manzo, L.; Rade-Edel, J.; Sabbioni, E. (Commission of the European Communities, Luxembourg). [nd]. 26p. NTIS, PC E03/MF E03.

Recent investigations have identified potential sources of environmental thallium pollution. The research takes into account environmental, toxicological and pharmacological aspects when considering the possibility of health hazard due to long-term exposure of man to low doses of thallium. The metabolic pathways of present environmental and toxic levels of thallium are investigated using nuclear and radiochemical techniques in laboratory animals. Metabolic patterns of thallium in rats at tissue and subcellular levels are considered. Biochemical and physiological effects on target tissues are assessed. The toxicity to laboratory animals and man is evaluated. Planned future experiments in present areas of collaboration are outlined.

34634 **(PB—83-133900) Tier II mutagenic screening of 13 NIOSH priority compounds: individual compound report, n,n-dimethylformamide.** McGregor, D.B. (Inveresk Research International Ltd., Musselburgh (UK)). 1 May 1981. 198p. NTIS, PC A09/MF A01.

N,N-Dimethylformamide (68122) (NND) was subjected to a tier II mutagenic test screening program. The assays included unscheduled DNA synthesis (UDS) assay in human diploid fibroblasts with exposure of 3 hours duration and concentrations up to 9,220 micrograms per milliliter of culture medium; dominant lethal test in male rats with exposure to atmospheres containing 10 parts per million (ppm) or 400ppm NND; sperm abnormality test in male mice using the same exposure conditions; cytogenetic test in male and female rat bone marrow cells using the same exposure conditions or a single exposure of 7 hours duration; and sex linked recessive lethal test in Drosphila-melanogaster with exposure to an atmosphere of 400ppm for 2.25 hours. There was no increase in UDS in cells treated with NND nor were there effects attributable to NND in the dominant lethal test on pregnancy frequency, numbers of corpora lutea or implantations, or the frequency of early deaths. Abnormal sperm frequency was not affected, the frequencies of chromosomal aberrations were not increased in rat bone marrow cells, and sex linked recessive lethal frequency was not increased in Drosphila. The author concludes that NND was devoid of genetic effects.

34635 **(PB—83-135905) Effects of inorganic lead on behavioral and neurologic function. Final report.** Repko, J.D.; Jones, P.D.; Garcia, L.S. Jr; Corum, C.R. (Louisville Univ., KY (USA)). Nov 1977. 103p. NTIS, PC A06/MF A01.

The effects of absorption of low concentrations of inorganic lead (7439921) (Pb) on worker behavior and neurologic function were studied. For one year, exposed and unexposed workers were subjected to performance and behavioral test measurements, neurological and electroneuromyographic examinations, and examination of biologic samples. The 140 examined workers (85 were lead exposed, 55 nonexposed) were in the storage battery manufacturing industry. The lead exposed group had a mean blood lead (PbB) of 46 micrograms per 100 milliliters, whereas the control group had 17 micrograms Pb per 100 milliliters. PbB aminolevulinic-acid-dehydrase, free erythrocyte PbB, protoporphyrin (FEP), urine lead, and aminolevulinic-acid were intercorrelated, and each measure could be predicted from the others. Except for a positive relationship between FEP and certain pure tone threshold measures, none of the biomedical indices had a significant relationship to the nerve conduction velocities (NCV) or behavioral measures.

34636 **Induction of retrovirus gene expression in mouse cells by some chemical mutagens.** Tennant, R.W.; Otten, J.A.; Myer, F.E.; Rascati, R.J. (Oak Ridge National Lab., TN). *Cancer Research;* **42**: 3050-3055(Aug 1982). Contract W-7405-ENG-26.

Cell cultures derived from a variety of mouse strains were compared for their relative capacity to be induced to express endogenous retrovirus proteins by exposure to 5-iododeoxyuridine under optimized experimental conditions. Induction frequencies varied between 6.0×10^{-1} and 1.7×10^{-2} with AKR cells showing the highest capacity and C57BL/6 x C3H F_1 cells the lowest. Virus expression was induced in AKR cells with other chemical mutagens of the polyaromatic hydrocarbon [benzo(a)pyrene and phenol, diol, and epoxide metabolites] and nucleoside analog classes, but alkylating agents were inconsistent or failed to induce. Considerable differences in the efficiency of induction were seen between various halogenated nucleosides, while under these conditions the nucleoside 5-azacytidine induced > 90% of AKR cells at a concentration of 2 to 4 μg/ml. The high frequency of induction by 5-azacytidine, relative to other nucleoside analogs, and the absence of induction by other mutgens further indicate that endogenous virus induction occurs via nonmutagenic mechanisms and that some mutagens may also affect regulatory functions independent of their mutagenic action.

34637 Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications. Klein-Szanto, A.J.P.; Terzaghi, M.; Mirkin, L.D.; Martin, D.; Shiba, M. (Oak Ridge National Lab., TN). *American Journal of Pathology;* **108**: No. 2, 231-239(Aug 1982). Contract W-7405-ENG-26.

A new model using xenotransplanted human epithelia was developed for the study of toxic and carcinogenic effects of chemicals. Epithelial cells from the respiratory tract of 4 male and 3 female premature and full-term fetuses were enzymatically removed and inoculated into deepithelialized rat tracheas. These were sealed at both ends and transplanted subcutaneously into nude mice. After 3 to 4 weeks, a normal mucociliary epithelium covered the tracheal lumen. At this stage the epithelial cells could be isolated again and transplanted into new denuded rat tracheas. This passaging could be repeated up to six times, each permitting an amplification factor of approximately 3. Tracheal transplants containing cells of human origin (in vivo Passages 2 to 4) were treated with 7,120dimethylbenz(a)anthracene. Hyperplasias, squamous metaplasias, and dysplasias were seen 1 to 8 weeks after initiation of treatment, indicating that the responses of human and rodent epithelial cells to polycyclic aromatic hydrocarbons are similar. Initial experiments with skin and esophageal epithelia suggest that other covering epithelia could also be used in this fashion for evaluation of toxicants and carcinogens that are likely to come into contact with these tissues.

34638 Dark epithelial cells in preneoplastic lesions of the human respiratory tract. Klein-Szanto, A.J.P.; Nettesheim, P.; Saccomanno, G. (Oak Ridge National Lab., TN). *Cancer (Philadelphia);* **50**: No. 1, 107-113(1 Jul 1982). Contract W-7405-ENG-26.

Dark epithelial cells, previously identified in preneoplastic lesions of rat tracheae induced with chemical carcinogens, were observed in similar lesions in human airways and investigated using plastic-embedded material from the lungs of 21 autopsy cases. The lesion types and the percentage of dark cells in their basal layers were as follows: squamous metaplasia without atypia = 13 +- 3%, squamous metaplasia with slight atypia = 13 +- 3%, squamous metaplasia with moderate atypia = 26 +- 5%, squamous metaplasia with severe atypia = 27 +- 4%, and carcinoma in situ 34 +- 11%. Notwithstanding a technical complication caused by differences in fixation and embedding procedures, it was possible to detect an increase in the number of dark cells in human preneoplastic lesions that was directly proportional to the degree of atypia. This increase points to the importance of these cells in neoplastic development and indicates that, regardless of their nature, the number of dark cells can be used as an indicator of the degree of atypia.

34639 Effect of metabolic activation on the cytotoxicity and mutagenicity of 1,2-dibromoethane in the CHO/HGPRT system. Brimer, P.A.; Tan, E.L.; Hsie, A.W. (Oak Ridge National Lab., TN). *Mutation Research;* **95**: 377-388(1982). Contract W-7405-ENG-26.

When ethylene dibromide ($EtBr_2$) was assayed with the Chinese hamster ovary/hypoxanthine-guanine phosphoribosyl transferase (CHO/HGPRT) system coupled with a rat liver metabolic activation system (S9) which contains Ca^{2+} (Ca, Mg-S9), the cytotoxicity of $EtBr_2$ was greatly increased over that obtained when NADP was omitted from the Ca, Mg-S9 or when $EtBr_2$ was assayed as a direct-acting agent. However, on a molar basis, the mutagenicity of $EtBr_2$ remained unaffected. The omission of Ca^{2+} from the Ca, Mg-S9 metabolic activation system (Mg-S9), with either the addition or omission of NADP, caused approximately a 2-fold decrease in the mutagenicity of $EtBr_2$ when compared to the results obtained by using the Ca, Mg-S9 system. The cytotoxicity of $EtBr_2$ was further increased when a purified microsomal fraction, prepared from the S9 fraction, was used in the presence of Ca^{2+}. In the absence of this calcium ion, this metabolic activation system was extremely cytotoxic to Chinese hamster ovary cells even without the presence of a mutagen or promutagen. The cytotoxicity of $EtBr_2$ in the following assay systems decreased in this order: Ca, Mg-microsomes > Ca, Mg-S9 > Mg-S9 > direct-acting agent ≧ Ca, Mg-S9 without NADP ≧ Mg-S9 without NADP. Cytotoxicity appears to be NADP-dependent. Addition of reduced glutathione to Mg-S0 without NADP increased the mutagenicity of $EtBr_2$ to values that did not exceed those obtained when $EtBr_2$ was tested as a direct-acting agent. On the molar basis, ethyl methanesulfonate (EMS) is less cytotoxic but equally as mutagenic as $EtBr_2$. However the mutant yield of EMS was higher than that of $EtBr_2$. Inclusion of Ca, Mg-S9 in the assay system had no effect on the biological activities of EMS.

34640 Evaluation of the host-mediated assay and body fluid analysis. A report of the US Environmental Protection Agency gene-tox program. Legator, M.S. (Univ. of Texas Medical Branch, Galveston); Bueding, E.; Batzinger, R.; Connor, T.H.; Eisenstadt, E.; Farrow, M.G.; Ficsor, G.; Hsie, A.; Seed, J.; Stafford, R.S. *Mutation Research;* **98**: 319-374(1982). Contract W-7405-ENG-26.

The methodologies and status of the Host-Mediated Assay were reviewed using the published literature available up to June 1980. The Working Group reviewed 274 documents, including abstracts, research articles, review articles, and publicly available contracts and grant final reports. From this group, abstracts and reviews were rejected from critical evaluation. 77 documents were accepted and reviewed by the Working Group and the test results summarized. These selected documents yielded 208 chemicals that were evaluated in the host-mediated assay. Of these chemicals, 133 were mutagenic in this assay with one or more indicators. 76 chemicals, several of which are not considered to be carcinogenic, were not detected by any of the indicators. Of the 208 chemicals, 125 had been tested in carcinogenicity assay in rodents. 90 or 71%, of the carcinogens were detected as mutagens in the Host-Mediated Assay. In several cases, those carcinogens not detected may have been negative because of improper selection of the indicator. The Working Group concluded that the Host-Mediated Assay is an important test in mutagenicity/carcinogenicity research and that, by proper selection of protocols and indicators, valuable information can be gained that otherwise would be overlooked by strict, in vitro assays.

34641 Zinc-induced resistance to alkylating agents: lack of correlation between cell survival and metallothionein content. Tobey, R.A.; Enger, M.D.; Griffith, J.K.; Hildebrand, C.E. (Los Alamos National Lab., NM). *Toxicology and Applied Pharmacology;* **64**: 72-78(1982).

Suspension cultures of line CHO Chinese hamster cells and three derived sublines which differ in their capacity to induce synthesis of metallothionein (MT) by at least a factor of 40-fold were exposed to 100 μm $ZnCl_2$ prior to treatment with the alkylating agent iodoacetate, and cytotoxicity was determined by measuring colony-forming ability. Three of the four types of cells exhibited an 8- to 10-fold enhancement in survival when pretreated with zinc, but there were two lines of evidence that suggested that the enhanced survival was not attributable to metallothionein. The only cell in the series which failed to exhibit increased survival when pretreated with zinc was the Cd/sup r/2ClO cell which is readily induced to synthesize MT when treated with $ZnCl_2$. An even stronger indication that metallothionein did not play a major role in the protective response was provided by the observation that CHO cells were protected by pretreatment with zinc, even though they are unable to induce synthesis of MT as a result of exposure to that metal. These results suggest the existence of a novel, zinc-inducible mechanism which protects cells against the toxic effects of alkylating agents.

34642 Species variance in the metabolic activation of polycyclic hydrocarbons. Selkirk, J.K.; MacLeod, M.C.; Moore, C.J.; Mansfield, B.K.; Nikbakht, A.; Dearstone, K. (Oak Ridge National Lab., TN). *UCLA Symposia on Molecular and Cellular Biology, New Series;* 331-349(1982). Contract W-7405-ENG-26.

Polycyclic hydrocarbons are metabolized to a series of oxygenated derivatives consisting of dihydrodiols, phenols, and quinones. A comparison of cell-free and intact cell systems shows considerable variation for benzo(a)pyrene metabolism depending upon the presence or absence of cytoplasmic transferases for conjugation of these hydroxylated derivatives. Comparative metabolism studies, including microsomes and intact cells from rat, mouse, hamster, and humans yield identical qualitative metabolite profiles with signifi-

cant quantitative variation. Macromolecular studies of benzo(a)pyrene diol-epoxides in hamster cells show specific binding of 7,8-diol-9,10-epoxide to DNA and 9,10-diol-7,8-epoxide to selected nuclear proteins. A comparative analysis of sodium dodecyl sulfate (SDS)-polyacrylamide gel electrophoresis suggests a unique specificity for regions of the benzo(a)pyrene molecule at the nuclear level. In addition, studies of carcinogenic 2-hydroxybenzo(a)pyrene in cell culture were studied. A diphenol was isolated and characterized as the major product in embryonic fibroblasts. A second minor metabolite was observed. The ratio of these two metabolites was reversed for epidermal cells.

34643 **Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease.** Revis, N.W. (Oak Ridge National Lab., TN). pp 365-375 of Cardiovascular toxicology. Van Stee, E.D. (ed.). New York, NY; Raven Press (1982). Contract W-7405-ENG-26.

Disease of the cardiovascular system accounts for about one-half of all deaths in most of the industrial countries. The cause(s) of cardiovascular disease remains to be determined, but several factors have been associated with the induction and/or progression of this disease. These factors include diet, drinking water quality, smoking, and trace elements. This chapter will focus on the experimental evidence that associates drinking water softness and trace elements with cardiovascular disease. The trace elements include vanadium, cadmium (Cd^{2+}), lead (Pb^{2+}), nickel [Ni(II)], and cobalt.

34644 **Resistance of germ-free athymic nude mice to two-stage skin carcinogenesis.** Holland, J.M.; Perkins, E.H. (Oak Ridge National Lab., TN). pp 423-433 of Third international workshop on nude mice. New York, NY; Gustav Fischer New York, Inc. (1982). Contract W-7405-ENG-26.

Germ-free athymic and normal littermate mice were compared with respect to their relative sensitivity to two-stage epidermal tumorigenesis. Dimethylbenzanthacene was applied either once or twice followed either by croton oil or 12-O-tetradecanoylphorbol 13-acetate (TPA) as a cocarcinogen. In separate experiments the acute response of both phenotypes to TPA was assessed by histological examination of skin as well as the incorporation of tritiated thymidine into epidermal DNA. Nude mice were observed to be less or comparable to normal littermate in sensitivity, depending upon experimental variables. The tendency of solvents to spread rapidly on the skin of nude mice appeared to influence susceptibility to papilloma induction. Other factors that would potentially modify the responsiveness of nude mouse skin include differences in skin structure, possibly associated with more frequent cycles of hair growth, as well as resistance to both the inflammatory and hyperplasiogenic effects of TPA. Grafting nude mice with an adult thymus during the latent period appeared to have little effect upon subsequent development of papilloma. However, grafts of weanling thymus 1 week prior to initial carcinogen exposure reduced the average multiplicity of papilloma in grafted relative to sham-grafted athymic controls.

34645 **Multistage skin tumor promotion: involvement of a protein kinase.** Mamrack, M.; Slaga, T.J. (Oak Ridge National Lab., TN). pp 81-106 of Biological carcinogenesis. Rich, M.A.; Furmanski, P. (eds.). New York, NY; Marcel Dekker, Inc. (1982). Contract W-7405-ENG-26.

The data presented from this laboratory suggest that at least two stages are important in the promotion process, both of which can obviously be produced by repeated TPS treatment after tumor initiation. We believe that one of the important events in the first stage involves the induction of dark basal keratinocytes. Mezerein is a potent second stage promoter, but only a weak complete promoter with much less ability to induce dark cells than TPA. In addition, FA and TPCK inhibit stage I of promotion and inhibit the induction of dark cells by TPA whereas RA does not, suggesting that the dark cells are important in stage I of promotion. These dark basal keratinocytes are slightly increased by wounding which correlates with its relatively weak promoting ability but not by EPP, which is a very weak promoting hyperplastic agent. In addition, a large number of these dark cells are found in papillomas and carcinomas. These dark cells may be primitive stem cells since they normally occur in large numbers in embryonic and newborn skin but are present in very small numbers in adult skin. It appears that the induction of ODC sactivity, followed by increased polyamines and increased cellular proliferation, are important events in stage II of promotion. The increase in a protein kinase activity by TPA with the capacity to phosphorylate tyrosine residues in epidermal proteins may be involved in the maintenance of a transformed phenotype similar to the Avian sarcoma virus coded protein kinase. By seeking to divide the carcinogenic process operationally into as many stages as possible and finding specific inhibitors of each stage, we will have a greater opportunity to understand the carcinogenic process as well as providing a rational and effective basis for the prevention of cancer. 65 references.

5604 Other Environmental Pollutant Effects

REFER ALSO TO CITATION(S) 34860

34646 (GSF-BPT—5/82, pp 33-37) **Plant action spectra: some thoughts on development and use.** Caldwell, M.M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The dose-response relationships for net photosynthetic inhibition of a higher plant, Rumex patientia, are shown for different spectral irradiance distributions. As the plant is presented with increments of radiation at shorter wavelengths the depression of net photosynthesis occurs much more rapidly. These dose-response data reveal linear relationships when there is a significant response to a particular radiation distribution.

34647 (GSF-BPT—5/82, pp 64-70) **Field trials with soybeans, rice and wheat under UV-B irradiances simulating several O_3 depletion levels.** Biggs, R.H.; Sinclair, T.R.; N'Diaye, O.; Garrard, L.A.; West, S.H.; Webb, P.G. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Soybeans, rice and wheat have been grown under field conditions with enhanced UV-B irradiation. Soybeans were at simulated 0 and 32 percent increases in UV-B irradiation levels above ambient while rice and wheat were at 0, 16, 23 an 32 percent simulated increases. This report will cover only effects on seed yields.

34648 (GSF-BPT—5/82, pp 71-82) **Effect of enhanced UV-B radiation on development and composition of plants.** Tevini, M.; Thoma, U.; Iwanzik, W. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The purpose of the present study is to evaluate the sensitivity of some crop plants (bean, cucumber, radish, barley) to different levels of enhanced UV-B radiation at a constant white light intensity. This is not closely related to natural irradiation condition but gives general information on the dependence of growth and composition of plants to increasing UV-B irradiation under defined environmental conditions.

34649 (GSF-BPT—5/82, pp 83-92) **Effect of enhanced UV-B radiation on leaf surface and anatomy.** Thoma, U.; Tevini, M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The purpose of the present investigations was to study the effects of enhanced UV-B radiation on anatomy and leaf surface of some crop plants during the first period of growth. The morphological changes of leaf surface are shown by SEM, biochemical changes in leaf surface compounds are described elsewhere (Steinmueller and Tevini 1982, this volume).

34650 (GSF-BPT—5/82, pp 102-107) **Response of different crop and vegetable cultivars to UV-B-irradiance: preliminary results.** Dumpert, K.; Boscher, J. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The experiments which are reported here were performed in continuation of the work of ESSER (1979, 1980) who conducted field experiments aimed at investigating the influence of increased UV-B-radiation on crop and vegetable plants of various species. In contrast to these investigations the work of this third phase concentrates on cultivar-specific differences between selected crop and vegetable cultivars.

34651 (GSF-BPT—5/82, pp 108) **UV-B radiation transmitting greenhouse for plant studies.** Biggs, R.H. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

34652 (GSF-BPT—5/82, pp 117-120) **UV-B sensitivity of plant photosynthesis as influenced by visible irradiation.** Caldwell, M.M.; Warner, C.W. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Experiments were made to separate the effects of preconditioning and concomitant visible irradiation and to investigate this with respect to both light-limited and light-saturated photosynthesis.

34653 (GSF-BPT—5/82, pp 132-139) **Action spectra for the depression of photosynthesis by UV irradiation in Lactuca sativa L. and Rumex alpinus L.** Bogenrieder, A. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In previous investigations it was shown that effects of UV on photosynthesis, growth and development of higher plants are mainly inhibitory, although over a long period stimulation may also be seen. These short term effects can often, depending on wavelength and fluence rate, to be found after only a few minutes. Further investigations showed that even by the highest available UB fluence rates, a linear relationship between total fluence and depression of photosynthesis occurred, at least for an irradiation period of 6 hours (Bogenrieder and Klein 1982). An action spectrum for this relatively short term effect is presented.

34654 (GSF-BPT—5/82, pp 142-144) **Geometrical considerations: a brief synopsis.** Caldwell, M.M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Some computer simulations were taken to determine the extent to which leaf inclination will reduce the incident UV-B radiation load on foliage.

34655 (GSF-BPT—5/82, pp 145-149) **Phenylpropanoid pigment synthesis and growth reduction as adaptive reactions to increased UV-B radiation.** Wellmann, E. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In bean leaves isoflavonoids occur strictly correlated with visible symptoms of damage in response to UV-B irradiation. Even long-term solar irradiations will not bring about this effect. The action spectra clearly show the principle difference in spectral effectivity in the cases of pigment formation in bean leaves (side effect of cell damage) and in parsley cell cultures (effective protective reaction). The cell cultures were found to be representative for flavonoid regulation in the intact plant and are used as a model system for studying the UV-induction mechanism at the molecular level.

34656 (GSF-BPT—5/82, pp 150-161) **Carbon metabolism of plants exposed to UV-B radiation.** Sisson, W.B. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The process of carbon metabolism has been shown to be sensitive to UV-B radiation and, as such was investigated. The UV-B radiation treatment intensive study included wavelengths within the active UV-B radiation waveband (280-315 nm). Photosynthesis rates were shown to be inhibited at a low photosynthetically-active radiation level. Chloroplast damage appeared to accumulate with duration of dose.

34657 (GSF-BPT—5/82, pp 164-168) **Effect of UV on photosynthesis and growth in dependence of mineral nutrition (Lactuca sativa L. and Rumex alpinus L.).** Bogenrieder, A.; Doute, Y. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

A clear increase in relative sensitivity of photosynthesis to UV-B occurs with increasing mineral concentration. As expected the chlorophyll content (a + b) per leaf area of control plants initially also increases (as can easily be noticed visualy). It remains, however, the same for the third to the highest concentration. The sensitivity of Rumex alpinus is higher but less influenced by mineral supply. In case of long term experiments, however, the relative differences between control and irradiated plants decreased clearly with increasing mineral supply. In Lactuca sativa, this is the opposite effect to the situation with short term irradiation.

34658 (GSF-BPT—5/82, pp 169-179) **Effects of UV B radiation on composition of two crop species during mild water stress.** Tevini, M.; Iwanzik, W.; Teramura, A.H. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

In this study results on the influence of UV-B radiation in combination with water stress on plant composition and function are presented.

34659 (GSF-BPT—5/82, pp 180-191) **Effects of UV-B irradiation on leaf resistances in two crop species during mild water stress.** Teramura, A.H.; Salm, S.; Tevini, M. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

This study is the first of a series of experiments investigating the effects of UV-B radiation on plants in combination with other frequently experienced environmental stresses. The net effect to several simultaneous stresses could be compensatory, additive, synergistic, or independent. It is hoped that such an approach will help understand the effects of UV-B radiation by providing a link between the large body of controlled environment studies and the currently ongoing field validation studies in both the U.S.A. and the F.R.G.

34660 (GSF-BPT—5/82, pp 192-202) **UV-B irradiation effects on soybean photosynthetic recovery from water stress.** Teramura, A.H.; Perry, M.C. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

The objective of this study was to examine the effects of UV-B irradiation on the kinetics of water stress recovery in soybeans by monitoring changes in net photosynthesis, stomatal resistance and dark respiration. This recovery was studied under two different phenological stages of growth to determine age-specific effects.

34661 (GSF-BPT—5/82, pp 204-210) **Impact of enhanced solar UV-B radiation upon the marine ecosystem.** Worrest, R.C. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Many organic molecules, most notably DNA, absorb UV-B radiation which can initiate photochemical reactions. It is life's ability, or lack thereof, to cope with enhanced levels of solar UV-B radiation that has generated the concern over the potential depletion of stratospheric ozone. The defense mechanisms that serve to protect both plants and animals from current levels or UV-B radiation are quite varied. Whether these mechanisms will suffice in the marine ecosystem under conditions of enhanced levels of UV-B radiation is the subject of this report. It is indicated that solar UV-B radiation is a stress agent, even at current levels. Further field studies are required either to corroborate or to qualify conclusions based on results from laboratory investigations or from models. The greatest impact of enhanced solar UV-B radiation may be on the subtle interactions that take place within an ecosystem, interactions which could lead to significant changes in the ecosystem.

34662 (GSF-BPT—5/82, pp 211-215) **Effect of UV-B radiation on the marine diatom Bellerochea yucatanensis.** Doehler, G. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

There exists no information about the UV-B fluence on several photosynthetic products and nitrogen metabolism. The present report describes the effect of low levels of UV-B radiation on pigments, ^{14}C- and ^{15}N-incorporation of the marine diatom Bellerochea yucatanensis.

34663 (GSF-BPT—5/82, pp 220-224) **Dose-time relationship for UV-tumorigenesis.** de Gruijl, F.R.; van der Leun, J.C. Jun 1982. Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany.

From Workshop on biological effects of UV-B radiation; Muenchen (Germany, F.R.) (25 - 27 May 1982).

Albino hairless SKh hr 1 were subjected to daily 280-360 nm UV irradiation. The maximum daily dose applied was 190 mJ/cm^2 which cause no acute effects. The median appearance time of first tumor was clearly dependent on the daily dose but not the tumor growth. In the course of chronic UV exposure, the epidermis continuously thickens and because of that the epidermal transmission decreases. Thus the total UV dose received at the basal level on the epidermis may be the decisive quantity for UV-tumorigenesis.

34664 (LBL—14986, pp 86-90) **Biological effects of magnetic fields.** Tenforde, T.S.; Gaffey, C.T.; Raybourn, M.S.; Levy, L. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

A brief summary of results obtained during the past year within the magnetic field bioeffects program is presented. Cardiovascular studies, retinal electrophysiology, animal physiology studies, and hematological studies are discussed. (KRM)

34665 (LBL—14986, pp 91-92) **Functional analysis of laser-induced ocular damage.** Raybourn, M.S.; Kong, R.L. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The goal of our research efforts has been twofold: (1) the reassessment of laser damage threshholds to retinal tissues using functional endpoints, and (2) the examination of laser damage mechanisms in retinal tissues. Our experimental approach has been to study the effects of different wavelength lines of laser light on retinal function as determined by monitoring the following electrophysiological signals: electroretinogram (ERG), early receptor potential (ERP), and intracellularly-measured light evoked responses in an in vitro retinal eyecup preparation.

57 HEALTH AND SAFETY

REFER ALSO TO CITATION(S) 33100, 34404, 34604, 34628, 34629, 34630, 34631, 34632, 34860

34666 (AD-A—120944/4) **Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82.** White, L.; Walker, J. (Electronic Data Systems Corp., Panama City, FL (USA)). Aug 1982. 201p. NTIS, PC A10/MF A01.

Past operational experiences of USAF fire fighting and rescue teams have indicated the need for an improved self-contained breathing apparatus (SCBA). In October 1980, a contract was awarded to Electronic Data Systems, Panama City, Florida, to design and develop a prototype SCBA that would meet Air Force technical requirements. A prototype was designed, developed, and tested through a subcontract with Reimers Consultants, Falls Church, Virginia. This report describes the technical requirements, a detailed technical description of the unit, and the unmanned test procedures and results. The unmanned testing demonstrate that the prototype SCBA meets all performance requirements, except for weight. The fully charged prototype weights 34 pounds, the maximum acceptable weight is 30 pounds. With the other performance requirements either met or exceeded, manned testing of the SCBA can proceed.

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 33177, 33241, 33245, 34822

34667 (Juel—1784) **$^{18}O/^{16}O$ ratio in groundwater of the Federal Republic of Germany.** Foerstel, H.; Huetzen, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Radioagronomie). May 1982. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750076.

More than 900 groundwater samples of 480 municipal water factories were collected at the area of the Federal Republic of Germany. The $^{18}O/^{16}O$-ratio decreases from the north (-7per mill) to south (below -11per mill) due to an increasing distance from the south ('continental effect') and an increasing altitude above sealevel ('altitude effect'). The decrease of the $^{18}O/^{16}O$-ratio per 1000 m altitude above sea level is 2.8per mill, per 1000 km distance from the sea 2.4per mill. At the coast an initial value of -7.2per mill results from the multicorrelation analysis. Except of two cases, some samples near to the coast and alongside river Rhine, the groundwater samples represent the mean oxygen isotope ratio of the local precipitation. This oxygen isotope ratio will be found in the conductive tissues of the plants (trees), too. Therefore the knowledge of the natural variation of the oxygen isotope ratio can serve as a tool in studies of plant physiology, water ecology, palaeclimatology and food analysis.

34668 (NUREG/CR—3207) **Geologic and hydrologic research at the Western New York Nuclear Service Center, West Valley, New York. Annual report, August 1981-July 1982.** Albanese, J.R.; Anderson, S.L.; Dunne, L.A.; Weir, B.A. (New York State Geological Survey, Albany (USA)). Mar 1983. 573p. NTIS, PC A24/MF A01 - GPO $8.50. Order Number DE83902084.

Portions are illegible in microfiche products.

This report details the research accomplished during the second part of the New York State Geological Survey's (NYSGS) three part program of geologic and hydrologic investigations at the Western New York Nuclear Service Center (WNYNSC) at West Valley, New York. During this reporting period, July 1981-July 1982, the surficial gravel and the underlying till surface of the North Plateau area were measured using core log data and seismic techniques. Contour and isopach maps are included and show the surficial gravel layer to be lenticular in cross section and approximately forty feet thick at its center. The history of drilling at the site and all available subsurface information pertaining to site strati-

graphy has been compiled and standardized. Geologic sections based upon the locations of all wells and their geologic logs show that a sandy stratum, previously reported to extend under the entire site at an elevation of 1350 feet, is not a continous layer. Analyses of surface and subsurface till samples show that Lavery Till can be subdivided into three subfacies using grain size distributions and the Kent Till can be distinguished from it by its higher silt content. Initial measurements for movement determination on two landslides yield an average downslope movement rate of 0.23 meters/year. A site slope domain map, establishing five domains of varying sliding potential, has been compiled from aerial photos and field mapping. The final phase of the Buttermilk Creek investigation and the study of the erosional history of the Cattaraugus Creek drainage basin have been initiated. A preliminary characterization of the relationship between precipitation and runoff on the North Plateau shows the income to outflow ratio is 3:1 during the summer and nearly equal to one in the winter.

34669 **(SAND—82-2441) Empirically determined uncertainty in potassium-argon ages for Plio-Pleistocene basalts from Crater Flat, Nye County, Nevada.** Sinnock, S.; Easterling, R.G. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 14p. NTIS, PC A02/MF A01. Order Number DE83011869.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Six samples of basalt from each of four sites in Crater Flat, Nye County, Nevada, were dated by potassium-argon isotopic methods, by each of three separate geochronology laboratories. The mean ages of the four sites range from about 0.4 my (million years) to 4.0 my. The standard error of an age is 0.16 my, regardless of age. Variation among the reported ages can be attributed to aliquot, sample, and interlaboratory differences, with the latter two being dominant. The standard deviation of an age for a single sample dated by one laboratory is estimated as 0.34 my. Overall, the results indicate that Quaternary basalts with approximately 1.5% potassium content can be assigned an age at 90% confidence to within an interval of about 1 my if multiple samples are dated by several laboratories. If only one sample is dated by a single laboratory, the interval increases to about 1.4 my.

5802 Geophysics

REFER ALSO TO CITATION(S) 32995, 33773, 34433

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 33229, 33569, 33570, 33571, 33572, 33573, 33574, 33575, 33576

34670 **(ONWI—314) Constitutive properties of salt from four sites.** Pfeifle, T.W.; Mellegard, K.D.; Senseny, P.E. (RE/SPEC, Inc., Rapid City, SD (USA)). Apr 1983. Contract AC06-76RL01830. 100p. NTIS, PC A05/MF A01. Order Number DE83011941.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Results are presented from laboratory strength and creep tests performed on salt specimens from the Richton dome in Mississippi, the Vacherie dome in Louisiana, the Permian basin in Texas, and the Paradox basin in Utah. The constitutive properties obtained are the elastic moduli and the failure envelope at 24°C and parameter values for the baseline creep law. Some additional data are presented to indicate how the elastic moduli and strength change with temperature. The constitutive properties given in this report and subsequent numerical simulations will serve as input to the screening of site locations for a nuclear-waste repository. The matrix of tests performed is the minimum effort required to obtain these constitutive properties. Comparison of results with those obtained for sites that have been characterized in greater detail suggests that the constitutive parameter values obtained are adequate for site-screening activity.

34671 **(ONWI—415) Brine migration in hot-pressed polycrystalline sodium chloride.** Biggers, J.V.; Dayton, G.O. (Pennsylvania State Univ., University Park (USA). Materials Research Lab.). Dec 1982. Contract AC06-76RL01830. 88p. NTIS, PC A05/MF A01. Order Number DE83011942.

This report describes experiments designed to provide data on brine migration in polycrystalline salt. Polycrystalling samples of various grain sizes, density, and purity were prepared from several commercial-grade salts by hot-pressing. Three distinct experimental set-ups were used to place salt billets in an induced thermal gradient in contact with brine source. The test designs varied primarily in the way in which the thermal gradient was applied and monitored and the way in which brine migration was determined. All migration was in enclosed vessels which precluded visual observation of brine movement through the microstructure. Migration velocities were estimated either by the timed appearance of brine at the hot face of the sample, or by determination of the penetration distance of migration artifacts in the microstructure after tests of fixed duration. For various reasons both of these methods were subject to a large degree of error. Our results suggest, however, that the migration velocity in dense polycrystalline salt may be at least an order of magnitude greater than that suggested by single-crystal experiments. Microstructural analysis shows that brine prefers to migrate along paths of high crystalline activity such as grain and subgrain boundaries and is dispersed rather quickly in the microstructure. A series of tests were performed using various types of tracers in brine in order to flag migration paths and locate brine in the microstructure more decisively. These attempts failed and it appears that only the aqueous portion of the brine moves through the microstructure with the dissolved ions being lost and replaced rather quickly. This suggests the use of deuterium as a tracer in future work.

34672 **(ONWI—421) MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 137p. NTIS (US Sales Only)PC E06/MF A01. Order Number DE83012467.

Portions are illegible in microfiche products. Original copy available until stock is exhausted. Includes 2 sheets of 24x reduction michrofiche.

MATLOC is a non-linear transient two-dimensional (planar and axisymmetric) thermal stress finite element code designed to determine the deformation within a fractured rock mass. The rock mass is modeled within MATLOC as a non-linear anisotropic elastic material which can exhibit stress-dependent bi-linear locking behavior. The numerical solution of the nonlinear equilibrium equations within MATLOC is performed using the incremental tangetial stiffness method in which the material stiffness matrices are continually updated. MATLOC can be used in conjunction with other SCEPTER transient thermal analysis codes (either DOT or SWENT) to model the thermomechanical behavior of fractured basalt, granite, tuff or shale. The bi-linear constitutive behavior within MATLOC provides a ubiquitous or equivalent continuum model of the fractured rock mass and cannot simulate the deformation of individual fractures. MATLOC is mainly suitable for use in room canister scale studies of the excavation, operational and short-term post closure processes for sites within geological media which do not exhibit significant viscoelastic (creep) phenomena or in situations where the viscoelastic behavior can be ignored. In Section 1.5 of this document the code custodianship and control is described along with the status of verification, validation and peer review of this report.

34673 **(SAND—83-0917C) Numerical studies of laboratory triaxial creep tests.** Branstetter, L.J.; Preece, D.S. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 12p. (CONF-830605—6). NTIS, PC A02/MF A01. Order Number DE83009697.

From 24. symposium on rock mechanics; College Station, TX, USA (20 Jun 1983).

Triaxial-creep experiments conducted on cyclindrical specimens provide the basic data for modeling the behavior of rock salt. Even in the most carefully performed of these experiments, friction-

al effects between the ends of the salt sample and the platens of the testing machine prevent homogeneous stress and strain conditions from being achieved. Using the finite-element technique, detailed analyses of uniaxial- and triaxial-creep experiments are performed to investigate the extent of the inhomogeneities caused by end effects. It is then possible to estimate the errors which the end effects produce in the interpretation of creep data on rock salt.

5804 Geochemistry

REFER ALSO TO CITATION(S) 33103

34674 **(BMFT-FB-T—82-152) Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting.** Kramar, U.; John, N.; Puchelt, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 76p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750088.

With fluorine as an indicator different extraction methods were tested for their suitability in geochemical prospecting for fluorite in stream sediments. The most common fluorine bearing minerals were treated with different extractants and the most favourable conditions for the determination of fluorine by ionsensitive electrodes have been determined. Radionuclide fluorescence analysis with semiconductor detector and on-line data handling is a mobile and versatile method for simultaneous multi-element determinations applicable for different kinds of samples as soils, stream sediment and rocks. Such a system was installed in a four wheel drive truck and allows simultaneous determinations of several elements in the field with only minor sample pretreatment. Measuring parameters, like sample geometry, conditions for the excitation of the characteristic X-rays, measuring time and grain size have been optimized with respect to a high sample output and simplest sample pretreatment. Both methods, F-analysis by ionsensitive electrodes and radio-nuclide X-ray fluorescence analysis were used for a reconnaissance stream sediment survey in an area of 400 km^2 in the south-eastern part of the Black Forest (F.R. of Germany) and for some campaigns of soil prospecting.

34675 **(INIS-mf—7751) Seminar on nuclear methods in mining, geology, geophysics, and geochemistry. Abstracts of papers.** (Ceskoslovenska Akademie Ved, Prague. Ustav Geologie a Geotechniky). [nd]. 35p. (CONF-8109213—Summ.). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780524.

From Conference on nuclear methods in mining, geology, geophysics and geochemistry; Bolebor, Czechoslovakia (7 Sep 1981).

Separate abstracts were prepared for papers from the seminar on nuclear methods in mining and geology. (KAW)

34676 **(ONWI—435) PHREEQE: a geochemical speciation and mass-transfer code suitable for nuclear waste performance assessment.** (INTERA Environmental Consultants, Inc., Houston, TX (USA)). Apr 1983. Contract AC06-76RL01830. 248p. NTIS (US Sales Only), PC E09/MF A01. Order Number DE83011660.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

PHREEQE is a Fortran IV computer program designed to model geochemical reactions. Based on an ion pairing aqueous model, PHREEQE can calculate pH, redox potential, and mass transfer as a function of reaction progress. The composition of solutions in equilibrium with multiple phases can be calculated. The data base, including elements, aqueous species, and mineral phases, is exterior to the computer code and is completely user definable. Geochemical processes will significantly influence the performance of nuclear waste repositories. The computer code PHREEQE, a modification of the USGS code, will be used to describe these processes for both far-field and near-field performance assessment, and to evaluate data acquisition needs and test data. The radionuclide transport codes will be run alternately with the PHREEQE code, which will be used to update the geochemistry of the system. This will be seen as a change in the value of the distribution coefficient, K/sub d/, as the fluid moves through the system. The code embodies the same ion-association conceptual model of solution behavior as the original USGS version and can simulate geochemical reactions. The code requires thermodynamic data for each solid, gaseous or dissolved chemical species being modeled. The two data bases supplied with the code are for testing purposes only, and should not be applied to real problems without first being carefully examined. Routines to restructure thermodynamic data were written to make the thermodynamic data bases interchangeable between PHREEQE and another geochemical package, EQ3/EQ6. The data preprocessor code, PHTL, is documented in Appendix A. Several test problems are described for code application demonstration. One problem verifies the code's ability to follow abrupt redox changes in a reaction path simulation, while another illustrates the temperature-changing capability of the code.

34677 (ORNL—5999, pp 119-129) **Earth sciences.** Tamura, T. Apr 1983. NTIS, PC A12/MF A01.

In Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090.

The major goal of the Earth Sciences Section (ESS) is to develop a geosciences program that will provide the information necessary for the understanding and effective utilization of our geophysical environment. The major emphasis continues to be in waste management; contributions of the staff are reflected in the waste programs of the Division. One of the growing areas is in the nonnuclear solid-waste technology. The interactions and effects of acid precipitation on the biotic community are of growing environmental concern. Development of atmospheric sampling methodologies at ORNL over the past few years is beginning to receive greater attention, and expanding programs in atmospheric research are utilizing these methods. Although only the technical aspects are summarized in this report, it is not the only product of this work; the groundwork of greater collaboration and cooperation with other sites in the United States has been laid during the year. This section presents summaries of several activities that may develop into more definitive projects or are of sufficient technical merit to be included as part of this report.

34678 **(USGS-OFR—78-179) Literature review of interaction of oxidized uranium species and uranium complexes with soluble organic matter.** Jennings, J.K.; Leventhal, J.S. (Geological Survey, Denver, CO (USA)). 1978. 53p. USGS, Open File Services, Box 25425, Denver Federal Center, Denver, CO.

Organic material is commonly found associated with uranium ores in sandstone-type deposits. This review of the literature summarizes the classes and separations of naturally occurring organic material but the emphasis is on soluble organic species. The main class of materials of interest is humic substances which are high-molecular-weight complex molecules that are soluble in alkaline solution. These humic substances are able to solubilize (make soluble) minerals and also to complex [by ion exchange and (or) chelation] many cations. The natural process of soil formation results in both mineral decomposition and element complexing by organic species. Uranium in solution, such as ground water, can form many species with other elements or complexes present depending on Eh and pH. In natural systems (oxidizing Eh, pH 5 to 9) the uranium is usually present as a complex with hydroxide or carbonate. Thermodynamic data for these species are presented. Interacting metals and organic materials have been observed in nature and studied in the laboratory by many workers in diverse scientific disciplines. The results are not easily compared. Measurements of the degree of complexation are reported as equilibrium stability constant determinations. This type of research has been done for Mn, Fe, cu, Zn, Pb, Ni, Co, Mg, Ca, Al, and to a limited degree for U. The use of Conditional Stability Constants has given quantitative results in some cases. The methods utilized in experiments and calculations are reviewed.

5805 Oceanography

34679 (N—8231655) **Wave kinematics and fluid loading in irregular waves.** Bosma, J.; Vugts, J.H. (Delft Hydraulics Lab. (Netherlands)). Nov 1981. 32p. (PUBL—259). NTIS, PC A03/MF A01.

The ability of a Gaussian random wave model to describe wave kinematics in a natural sea for engineering applications was investigated. Surface elevation and horizontal and vertical velocities were measured simultaneously in a flume. Nine wave spectra, covering a wide range of sea states, were studied. Measurements and prediction agree well for unidirectional waves, and the influence of directional spreading in multidirectional seas can be accomodated. Model representations of the kinematics in the free surface zone, and predictions of the tails of statistical distributions of surface elevation and velocities must be improved.

64 PHYSICS RESEARCH

6401 Astrophysics And Cosmology

REFER ALSO TO CITATION(S) 34765, 34786, 34826, 34833

34680 (DOE/ER/40048—23P2) **Non-empty universe.** Zee, A. (Washington Univ., Seattle (USA). Dept. of Physics). Aug 1982. Contract AC06-81ER40048. 5p. (CONF-8208132—1). NTIS, PC A02/MF A01. Order Number DE83011615.

From Summer school on Gamow cosmology; Varenna, Italy (1 Aug 1982).

We give an overview of the growing interplay between particle physics and cosmology.

34681 (INIS-SU—144, pp vp) **Ambiguity of limiting transition from the Brans-Dicke theory to the Einstein theory.** Pyzh, V.M. 1981. (In Russian). NTIS (US Sales Only), PC A05/MF A01.

Portions are illegible in microfiche products3 refs.

In Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection.

Limiting transition from the scalar-tensor Brans-Dicke gravitation theory to the Einstein general relativity theory is studied. Its ambiguity is shown on the example of the Friedman isotropic cosmological model. This ambiguity is investigated in detail within the frames of the flowsheet generalizing the Brans-Dicke theory. The limiting branches of this theory admitting inambiguous interpretation from the view point of the general relativity theory are marked out.

34682 (INIS-SU—144) **Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection.** (Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya Ukrainskoj SSR, Kiev). 1981. 95p. (In Russian). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780487.

Abstracts of individual items from the collection were prepared separately for the data base. (GHT)

34683 (MPI-PAE/Extraterr.—170) **Role of cyclotron resonance processes in the spectra of accreting neutron stars.** Truemper, J. (Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.). Inst. fuer Extraterrestrische Physik). Sep 1981. 10p. Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.).

From Workshop on gamma-ray transients and related astrophysical phenomena; San Diego, CA (USA) (5 - 8 Aug 1981).

We briefly review the observational situation regarding cyclotron resonance features in the spectra of pulsating sources and then turn our attention to problems arising in the context of gamma-ray burst spectra. Finally we discuss some recent work done on the radiative transfer in homogeneous plasmas under superstrong magnetic field conditions.

34684 (N—8311007) **Stationarity of magnetohydrodynamic fluctuations in the solar wind.** Matthaeus, W.H.; Goldstein, M.L. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Jun 1982. 42p. (NASA-TM—83963). NTIS, PC A03/MF A01.

Solar wind research and studies of charged particle propagation often assume that the interplanetary magnetic field represents a stationary random process. The extent to which ensemble averages of the solar wind magnetic fields follow the asymptotic behavior predicted by the ergodic theorem was investigated. Several time periods, including a span of nearly two years, are analyzed. Data intervals which span many solar rotations satisfy the conditions of weak stationarity if the effects of solar rotation are included in the asymptotic analysis. Shorter intervals which include a small integral number of interplanetary sectors also satisfy weak stationarity. The results are illustrated using magnetometer data from the ISEE-3, Voyager and IMP spacecraft.

34685 (N—8311010) **Study of the diffuse galactic gamma radiation.** Fichtel, C.; Kniffen, D. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Aug 1982. 11p. (NASA-TM—83992; CONF-8209133—1). NTIS, PC A02/MF A01.

From International workshop on very high energy gamma ray astronomy; Ootaccamund, India (20 Sep 1982).

Assuming cosmic rays pervade the Galaxy, they necessarily produced high energy gamma-rays as they interact with the instellar matter and photons. The cosmic ray nucleon interactions five rise to gamma rays primarily through the decay of pi mesons, giving a unique spectrum with a maximum at approximately 68 MeV. Cosmic ray electrons produce gamma rays through bremsstrahlung, but with a markedly different energy spectral shape, one which decreases monotonically with energy. Cosmic ray electrons also interact with the interstellar starlight, optical and infrared photons, and the blackbody radiation through the Compton process. A model of galactic gamma ray production is discussed, and the predicted spatial distribution and energy spectra are presented. Considering the uncertainty in the point source contributions, the agreement between the theoretical predictions and the gamma ray data seems quite reasonable.

34686 (N—8311011) **Origin of relativistic particles and gamma-rays in quasars.** Protheroe, R.J.; Kazanas, D. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Aug 1982. 18p. (NASA-TM—83983). NTIS, PC A02/MF A01.

A model for a class of quasars and active galactic nuclei is proposed in which a shock around a massive black hole randomizes the infall kinetic energy of spherically accreting matter producing a nonthermal spectrum of high energy protons. It is suggested that these protons are responsible for the secondary production (via proton decay) of the radio emitting high energy electrons and also of high energy gamma-rays (via proton decay and inverse Compton interactions of the electrons). The correlation between radio and gamma-ray emission implied by the model is in good agreement with observations of 3C273. Observation of the flux of high energy neutrinos from quasars may provide a test for the model.

34687 (N—8311012) **Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon.** Santo, C.M.E.; Rao, K.R. (Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)). Jun 1982. 27p. (In several languages). (INPE—2438-PRE/139). NTIS, PC A03/MF A01.

The diffuse component of gamma rays in the 15 to 75 Mev range arriving from near the galactic center was determined by using a digitized spark chamber which was launched aboard two balloons. In each flight the detector reached an altitude of 2,2 g/sq. cm. Based on these data, a diffuse gamma ray flux at energies of 21, 36, 52, 67 Mev respectively was obtained. These values give a power law spectrum with spectral index equal to -3,3. The dependence of this radiation with the galactic latitude and longitude was also obtained.

34688 **(N—8313047) Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4.** Wiehl, H.J.; Desai, U. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Sep 1982. 29p. (NASA-TM—84929). NTIS, PC A03/MF A01.

Two short duration single spike events of 1978 May 5 and December 4 exhibit similar time profiles in the microwave and hard X-ray ranges, indicating emission from compact sources. Microwave spectral observations exhibit inhomogenecieties present in the source parameters. The existence of fine time structures in the microwave time profiles at 10.4 GHz from Berne are interpreted as a signature of the dynamics of a disturbance travelling through the souce at the ion-sound speed. Stereoscopic observations with the hard X-ray detector on the solar orbiter, Helios-2, and the Berne microwave antennae do not indicate any time lag or differences in the time profiles during the impulsive phase. This is taken as evidence for the absence of directionality of emission making beam models unlikely for short duration single spike events.

34689 **(N—8313048) The Pinhole/Occulter facility.** Dabbs, J.R.; Tandberg-Hanssen, E.A.; Hudson, H.S. (National Aeronautics and Space Administration, Huntsville, AL (USA). George C. Marshall Space Flight Center). Oct 1982. 16p. (NASA-TP—2089). NTIS, PC A02/MF A01.

The outer solar atmosphere exhibits a great variety of dynamic and energetic plasma phenomena, from the catastrophic energy release of solar flares to the steady acceleration of the solar wind. The Pinhole/Occulter Facility contains the instruments necessary for broadband X-ray imaging, combined with simultaneous ultraviolet and white light spectroscopy and imaging.

34690 **(N—8314057) On the nature of 2 gamma bursts with spectral evolutions observed by the Konus experiment.** Liang, E.P. (Lawrence Livermore National Lab., CA (USA)). Oct 1982. 15p. (NASA-CR—169562). NTIS, PC A02/MF A01.

Several unique features of the evolving spectra of the April 2, 1979B, and November 11, 1979 gamma-ray bursts observed by the Konus experiment can be used to determine a number of critical parameters of the sources, within the context of the thermal synchrotron model, including their luminosity distance. These results shed much light on the origin of these events and possibly gamma bursts in general.

34691 **(N—8314058) Analyses of the Konus catalogue of gamma-ray bursts with the thermal synchrotron model.** Liang, E.P.; Jernigan, T. (National Aeronautics and Space Administration, Moffett Field, CA (USA). Ames Research Center). Sep 1982. 47p. (NASA-TM—85148). NTIS, PC A03/MF A01.

Approximately 150 reported gamma bursts of the Konus catalogue using the thermal synchrotron model are analyzed. An overwhelming majority of these spectra can be satisfactorily fitted by theoretical thermal synchrotron spectra of mildly relativistic electrons in strong magnetic fields, making the strong-field neutron star picture at least self-consistent. Valuable additional information is also extracted from various spectral features contained in many of the events.

34692 **(RL—82-075) Mass loss from astronomical objects. RAL workshop on astronomy and astrophysics.** Gondhalekar, P.M. (ed.). (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.). Apr 1982. 152p. (CONF-8204100—). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780485.

From RAL workshop on astronomy and astrophysics; Abingdon, UK (26 Apr 1982).

Separate abstracts were prepared for items in scope for the Energy Data Base. (LTW)

34693 **Astrophysics and grand unification.** Kolb, E.W. (Los Alamos National Lab., NM). pp 177-190 of Gauge theories, massive neutrinos, and proton decay. Perlmutter, A. (ed.). New York, NY; Plenum Publishing Corporation (1981).

The impact of grand unified theories on astrophysics and cosmology is reviewed. In particular, the possibility of generating the observed baryon asymmetry in the hot big bang early universe is discussed within the framework of models based on SU(5).

34694 **Pacific Northwest Laboratory operated by Battelle Memorial Institute for the Department of Energy.** *American Astronomical Society, Bulletin;* **13**: No. 1, 363-364(1981). (PNL-SA—9012).

A progress report is given for the Rattlesnake Mountain Observatory. The report includes personnel, equipment, astronomy research, research in atmospheric sciences, research in aeronomy, and a note on the Mt. St. Helens eruption.

34695 **Candidate samples for the earliest lunar crust.** Jovanovic, S.; Reed, G.W. Jr. (Argonne National Lab., IL). pp 101-111 of Proceedings of a conference on lunar highlands crust. Papike, J.J.; Merrill, R.B. (eds.). Washington, DC; National Science Foundation (1980).

A group of non-mare samples has a Cl/P_2O_5 ratio that is much lower than in other lunar samples. Two clusters of samples with order(s) of magnitude differences in minor and trace element contents make up the group. They were all returned from non-mare sites; no mare basalt or Apollo 16 anorthositic samples are included. It is proposed that these samples could be relics from an original lunar crustal layer which evolved more or less independently but concurrently with the differentiation of an underlying deep magma ocean from which all other samples were eventually derived.

6402 Atmospheric Physics

REFER ALSO TO CITATION(S) 34694

34696 **(LA-UR—83-1014) Field-aligned currents near the magnetosphere boundary.** Hones, E.W. Jr. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 29p. (CONF-830472—1). NTIS, PC A03/MF A01. Order Number DE83011333.

From Chapman conference on magnetospheric currents; Irvington, VA, USA (5 Apr 1983).

This paper reviews present thinking about the structure of magnetospheric boundary layers and their roles in the generation of the field-aligned currents that are observed in the polar regions. A principal effect of the momentum loss by magnetosheath plasma to the magnetosphere boundary regions just within the magnetopause, whether it be by a diffusive process or by magnetic reconnection, is the tailward pulling of surface flux tubes relative to those deeper below the surface. The dayside region 1 currents at low altitudes flow along field lines in the resulting regions of magnetic shear. The direction of the shear and its magnitude, measured in the boundary region, confirm tht the polarities and intensities of the dayside region 1 currents can be accounted for by this process. The low latitude boundary layer, formerly thought to be threaded entirely by closed field lines, now appears to contain at least some open field lines, newly reconnected, that are in the process of being swept into the high latitude tail to form the plasma mantle. The open flux tubes of the flux transfer events, thought to be the product of patchy reconnection have a spiral magnetic structure whose helicity is such as to suggest currents having the polarities of the region 1 currents.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 33926, 33988, 34050, 34122, 34181, 34305, 34899

34697 **(BNL—32910) Atomic collision experiments utilizing low-velocity, highly-charged ion beams.** Johnson, B.M.; Jones, K.W.; Meron, M. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 5p. (CONF-821123—41). NTIS, PC A02/MF A01. Order Number DE83011650.

From 7. conference on the application of accelerators in research and industry; Denton, TX, USA (8 Nov 1982).

Portions are illegible in microfiche products.

Intense beams of highly-stripped ions are now routinely produced at low velocities using the Brookhaven dual MP-tandens in a unique four-stage accel/decel mode. This mode of operation combines three stages of acceleration, stripping at high energy, and one stage of deceleration to near-zero velocity. To date, experiments have used 10-100 nA beams of bare and few-electron heavy ions at energies as low as 0.2 MeV/amu, and upgrades of the facility should push the lower limit below 0.1 MeV/amu. Recent experiments, such as measurements of charge transfer and x-ray production for S/sup 6-16+/ on He and Ar at 6 to 20 MeV and P(b) measurements for MO x-rays produced in Cl^{10+} + Ar collisions at 20, 10, and 5 MeV have demonstrated the usefulness of highly-stripped, low-velocity projectiles. These experiments and a few possibilities for future experiments are discussed.

34698 (CONF-820331—, pp 1-6) **Elastic scattering data for electrons in attaching gases.** Rees, J.A. (Univ. of Liverpool, England). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Available data for the elastic scattering of electrons in gases are discussed, with particular reference to measurements of differential cross sections at low energies for electrons in electron-attaching gases.

34699 (CONF-820331—, pp 23-33) **Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_3F_6).** Aschwanden, T.; Boettcher, H.; Hansen, D.; Jungblut, H.; Schmidt, W.F. (Hahn-Meitner-Institut fuer Kernforschung Berlin GmbH, Germany). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The low field ion mobility and the ion-ion recombination coefficient in hexafluoropropene were measured in the density range 1.6×10^{18} cm^{-3} (67 mbar) to 1.9×10^{20} cm^{-3} (6.52 bar) at 296°K. An anomalous density dependence of the ion mobility was observed, which is discussed on the basis of a transport model involving cluster formation. The effective ionization coefficient (α-eta)/N as a function of E/N exhibited also a density dependence. Measurements of the photo ionization threshold did not show anomalous density effects. It is concluded that the attachment process is responsible for the density dependence of (α-eta)/N.

34700 (CONF-820331—, pp 40-44) **Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases.** Siddagangappa, M.C.; Lakshminarasimha, C.S.; Naidu, M.S. (Indian Inst. of Science, Bangalore). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The attachment coefficients (eta/N) in freon (CCl_3F_3) over the range $28 \leqq E/N \leqq 282$ Td (E is the electric field in Vm^{-1}, N is the gas number density in m^{-3}, 1 Td = $10^{-21}Vm^2$) where ionization is practically insignificant, are evaluated from the Townsend's current growth curves obtained for the mixtures of Argon-Freon ($56 \leqq E/N \leqq 282$) and Helium-Freon ($28 \leqq E/N \leqq 85$). Although eta/N values are available in the literature at $E/N \geqq 330$, to the author's knowledge the present data are being reported for the first time.

34701 (CONF-820331—, pp 45-51) **Analytic formulation of electron distribution function from transport coefficients of electron swarm.** Maurel, J.; Bayle, P.; Bayle, M.; Forn, G. (Universite Paul Sabatier, Toulouse, France). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

A method for the solution of Boltzmann equation is set up. By this method, based on the probabilistic approach of this equation, we deduce from some mean macroscopic coefficients (as the mobility and the energy) very well known experimentally, a microscopic behavior of electrons in terms of a speed distribution function. This method is able to set forth an analytic formulation of the electron distribution function for a partially ionized gas. This function is a time dependent and position independent one. It is possible to establish the exact solution in the case of a Boltzmann equation with a degenerate scattering kernel of finite rank. For the stationary solution, a scattering kernel may be reduced to an equivalent separate kernel, and the stationary distribution function is formulated as a function of mobility, electron temperature and the a priori modeling distribution after the collision. The method set up in this work does not use the differential cross sections and fits very well with the microscopic study of discharges in gas mixtures in which the macroscopic coefficients are better known than the differential cross sections.

34702 (CONF-820331—, pp 53-59) **Streamer-to-spark transition in short point-to-plane gaps.** Sigmond, R.S. (Norwegian Inst. of Tech., Trondheim); Goldman, M. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Streamer current pulses have been analyzed in air of varying pressure and humidity and in SF_6 at 60 Torr gas pressure, in order to study the influence of the experimental parameters on the attachment processes in the streamer development and the streamer energy necessary for spark transition.

34703 (CONF-820331—, pp 60-67) **Validity of streamer mechanism in compressed gases.** Pfeiffer, W.; Leitl, A. (Technische Hochschule Darmstadt, Germany). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The streamer mechanism which was experimentally found at low gas pressure is also used to explain prediscbarge development in compressed gases for rather uniform fields. In electronegative gases, however, even at low gas pressure it has not been possible until now to observe electron avalanches of critical size. Only the last phase of prediscbarge development that is the cathode - directed streamer could be verified until now. Meanwhile it has also become possible to resolve the formation of the avalanche head and the transition into the streamer. These recent investigations are reported in this contribution. Main result is the exact verification of the streamer theory in compressed nitrogen. In SF_6, however, the streamer theory must be modified. The radiation of the critical avalanche alone is not sufficient for streamer inception. Additional carrier generation is necessary in order to cause higher field distortion.

34704 (CONF-820331—, pp 92-96) **Mass spectrometry of low energy ions extracted from medium pressure air coronas.** Sigmond, R.S. (Norwegian Inst. of Tech., Trondheim). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This work concerns the extraction and mass spectroscopic analysis of near-thermal energy ions from coronas in 2.5-20 kPa air, using molecular- or transition-flow orifices in Al, Au, Cu, Mo, stainless steel, and composite sandwich foils. The extraction foils show material- and ion-dependent transmittance differences which must be ascribed to surface potential variations and, possibly, catalytic effects. For the extraction of low-energy negative ions from air, stainless steel and Mo foils seem to be fairly reliable. For the extraction of low-energy positive ions, no reliable extraction orifice material has been found. 18 references.

34705 (CONF-820331—, pp 141-145) **Sparking potentials calculated from the electron-molecule collision properties of gases.** Raju, G.R.G.; Hackam, R. (Univ. of Windsor, Ontario). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The sparking potentials of high pressure electronegative gases are calculated from the electron-molecule collision properties such as the ionization, attachment and momentum transfer cross sections and the ionization and detachment energies. The method adopted is to calculate the properties of the electron swarm using a Maxwellian electron energy distribution and calculate the value of E/N (E = electric field intensity, in V/cm, N = gas number density in cm^{-3}) at the onset of the breakdown to satisfy the well established condition that the ionization coefficient is equal to the attach-

ment coefficient. The method is used to calculate the sparking potentials in pure gases as well as binary and ternary gas mixtures. Good agreement is obtained between the calculated and measured values.

34706 (CONF-820331—, pp 146-150) **Spectroscopic study of low pressure fluorine-containing gas discharge.** Matsuzawa, H.; Suganomata, S. (Yamanashi Univ., Kofu, Japan). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

A new phenomenon, enhanced photoemission, which is characteristic of fluorine-containing molecular gases was studied spectroscopically. The photoemission from arc discharges in SF_6 at 3 to 40 Torr and in CF_4 at 10 to 100 Torr increased suddenly while the arc current was decaying. Experimental results are presented concerning both temporal and spatial behavior of the enhanced photoemission and a simplified model for this phenomenon is presented.

34707 (CONF-830130—) **Proceedings of the workshop on atomic physics with fast heavy-ion beams.** Kanter, E.P.; Minchinton, A. (eds.). (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 295p. NTIS, PC A13/MF A01. Order Number DE83011656.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

The Workshop on Atomic Physics with Fast Heavy-Ion Beams was held in the Physics Division, Argonne National Laboratory on January 20 and 21, 1983. The meeting brought together ~ 50 practitioners in the field of accelerator-based atomic physics. The workshop was held to focus attention on possible areas of atomic physics research which would benefit from use of the newest generation of accelerators designed to produce intense high-quality beams of fast heavy ions. Abstracts of individual paper were prepared separately for the data base.

34708 (CONF-830130—, pp 16-32) **Collisions of fast heavy ions: an overview.** Meyerhof, W.E. (Stanford Univ., CA). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

At Stanford, we have studied inner-shell processes, particularly K-shell ionization and subsequent radiative decay, in targets ranging from Z/sub t/ = 4 to 92 and projectiles from Z/sub p/ = 1 to 92 with energies from 0.5 to 5000 MeV/amu. 24 references.

34709 (CONF-830130—, pp 33-72) **X-ray spectroscopy with fast heavy-ion beams.** Richard, P. (Kansas State Univ., Manhattan). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

The 1s Lamb shift in hydrogen-like heavy ions will be discussed. As a test case, we are studying Cl^{16+} $2p \rightarrow 1s$ x rays produced in high velocity collisions with a C foil. This experiment requires a high resolution measurement of the x-ray transition energy which is then compared with the calculated Dirac energy for the same transition. The 1s Lamb shift is defined as the shift of the 1S/sub 1/2/ level due to all QED effects which are not included in the Dirac equation minus the shift of the 2P/sub 1/2/ (or 2P/sub 3/2/) level due to all QED effects.

34710 (CONF-830130—, pp 73-86) **Ultraviolet spectroscopy with highly-stripped heavy ions.** Livingston, A.E. (Univ. of Notre Dame, IN). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

The excited-state structures of highly-stripped heavy ions are important testing grounds for the effects of relativistic contributions in atomic structure calculations of high-Z systems. Spectroscopic studies of both few-electron and many-electron highly-ionized atoms have recently enhanced our experimental knowledge of such effects as fine structure, Lamb shifts, polarizabilities, and intercombination decay rates. Several examples of these studies are presented from areas of current experimental interest involving the atomic spectroscopy of fast heavy ions. The need for extending these measurements to higher-Z ions using the new generation of heavy-ion accelerators is discussed. 21 references.

34711 (CONF-830130—, pp 87-117) **Electron spectroscopy with fast heavy ions.** Schneider, D. (Argonne National Lab., IL). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Since about 1970 the spectroscopy of Auger-electrons and characteristic x-rays following energetic ion-atom collisions has received a great deal of attention. An increasing number of accelerators, capable of providing a large number of projectile ion species over a wide range of projectile energies, became available for studying ion-atom collision phenomena. Many charged particles from protons up to heavy ions like uranium can be accelerated to energies ranging over six orders of magnitude. This allows us to study systematically a great variety of effects accompanied by dynamic excitation processes of the atomic shells in either the projectile- or target-atoms. The studies yield fundamental information regarding the excitation mechanism (e.g., Coulomb and quasi-molecular excitation) and allow sensitive tests of atomic structure theories. This information in turn is valuable to other fields in physics like plasma-, astro-, or solid-state (surface) physics. It is a characteristic feature of fast heavy-ion accelerators that they can produce highly stripped ion species which have in turn the capability to highly ionize neutral target atoms or molecules in a single collision. The ionization process, mainly due to the strong electrical fields that are involved, allows us to study few-electron atoms with high atomic numbers Z. High resolution spectroscopy performed with these atoms allows a particularly good test of relativistic and QED effects. The probability of producing these few electron systems is determined by the charge state and the velocity of the projectile ions. In this contribution the possibilities of using electron spectroscopy as a tool to investigate fast ion-atom collisions is discussed and demonstrated with a few examples. 30 references.

34712 (CONF-830130—, pp 132-160) **Inner-shell x-ray and auger spectroscopy: manifestation of the Breit interaction in properties of few-hole and few-electron atomic systems.** Crasemann, B. (Stanford Univ., CA). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

The striking effect of the Breit interaction on multiplet splitting, hypersatellite shifts and decay rates is shown. (GHT)

34713 (CONF-830130—, pp 161-179) **Recoil ions: production and uses.** Cocke, C.L. (Kansas State Univ., Manhattan). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Some aspects of the production and uses of recoil ions produced by bombardment of gaseous targets by fast heavy ions are discussed. The idea is illustrated showing a fast projectile passing by a target at rest. The nucleus receives an impulse which is only Z/sub t/ bigger than that given to each electron, and thus the mass factor dominates. The center of mass energy of the recoil is much less than the energy given to all of the electrons. Thus one can produce very slow but highly charged ions. The major uses to which such recoils have been put include photon and electron spectroscopy, use in situ for secondary electron capture, and use as an ion source for an external beam.

34714 (CONF-830130—, pp 180-189) **Trapping of slow recoil ions: past results and speculations on the future.** Prior, M.H. (Lawrence Berkeley Lab., CA). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

A simple electrostatic ion trap has been utilized to capture low energy recoil ions made by fast heavy ion impact upon a neon gas target. The heavy ion beams have been provided by the LBL SuperHILAC and the work has so far concentrated upon studies of the decay of the trapped ion population in time following creation by the pulsed HILAC beam (3.3 msec pulse length, 36Hz repetition rate). The various charge states decay predominantly via electron

capture collisions with the ambient gas in the ion trap. By varying the gas composition and density, one can determine the electron capture rate constants from which an effective (velocity averaged) capture cross-section can be obtained. The uniqueness of this work lies in the high charge states, up to Ne^{10+} (fully stripped), and the low mean collision energies available (in the range 1.0 to 70.0 eV).

34715 (CONF-830130—, pp 190-211) **Resonant coherent excitation of fast heavy ions.** Datz, S. (Oak Ridge National Lab., TN). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

The effects of heavy ions passing through crystal lattices in the channeling direction are discussed. These include probability of electron loss, excitation, effects of crystal field, and the effect of deviation from the channeling direction. (GHT)

34716 (CONF-830130—, pp 212-231) **Slowing down of fast heavy ions in matter.** Geissel, H. (GSI, Darmstadt, Germany). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Some characteristic features are presented on the stopping power. (S) and the energy loss straggling (δ E) of 0.5 to 10 MeV/u heavy ions ($18 \leqq Z_1 \leqq 92$) in solids and gases. For partially stripped ions the stopping was found to be smaller in gases than in solids, suggesting that the ionic charge during the interactions is smaller in gases due to the lower collision frequencies. The Z_8 oscillations decrease with increasing velocity and decreasing atomic number of the projectile. These experimental observations cause serious limitations in the accuracy of the effective charge concept which calculates the heavy ion stopping powers from those of protons. The effective charge is a function of the stopping medium and can vary by up to 20%. A comparison of effective charges in gases with the measured mean charge states after the medium indicates the influence of higher-order corrections. Comparisons with theories and semi-empirical tables demonstrate discrepancies in S values by up to 30%. The measured energy loss straggling of heavy ions in gases agrees surprisingly well with the simple Hvelplund-Firsov formula which does not include charge exchange straggling.

34717 (CONF-830130—, pp 232-251) **Laser spectroscopy with fast heavy ion beams.** Murnick, D.E. (Bell Labs., Murray Hill, NJ). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Heavy ion accelerators such as the Argonne tandem-linac facility provide beams of a wide variety of species and charge states. Large amounts of data can be obtained by various spectroscopies of the beam or beam interactions products. These spectroscopies include various optical, x-ray and electron measurements. The laser oscillator is a tunable, monochromatic light source. Monochromaticity implies unsurpassed resolution in determining resonance wavelengths and widths. Except for the very weakest transitions, easily attainable laser linewidths are less than other broadening mechanisms such as natural linewidth and Doppler broadening. Tunability implies universal application to atomic species. Lasers continuously tunable through the visible and near ir are available. Tuning ranges are being extended toward the uv. Discrete wavelength lasers are available beyond the visible and the high velocity of accelerated beams can be used to extend tuning ranges via the Doppler effect. In addition, lasers are intense coherent sources. These properties lead to extremely high sensitivity to rare species or to low cross-section transitions and often provide a good match to accelerator beam properties. In an experiment described a 1 kW CO_2 laser was focussed onto a 1 mm^2 particle beam driving a transition from an atomic level living only 15 nanoseconds.

34718 (CONF-830130—, pp 269-277) **Semiempirical studies of the spectra heavy and highly ionized atoms.** Curtis, L.J.; Ramanujam, P.S. (Univ. of Toledo, OH). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Fast ion beam methods provide a convenient means for the study of very heavy and very highly ionized atoms, for which little spectroscopic data presently exist. High wavelength resolution of a fast moving source can be achieved through optical refocusing techniques, but there is a need for very accurate wavelength predictions and precisely known calibration lines. The accuracies required for spectroscopic classification often exceed the present capabilities of ab initio theoretical calculations for high relativistic many electron systems, and semiempirical data parameterizations can often provide more accurate predictions. We are carrying out a program of studies of the properties of these systems that combines experimental measurements by fast ion beam excitation with semiempirical data parametrizations to identify and exploit regularities in their properties. Through the acquisition and systematization of empirical data, remarkably precise methods for predicting excitation energies, transition wavelengths, transition probabilities, level lifetimes, ionization potentials, core polarizabilities, and core penetrabilities are being developed and applied. Parametrized extrapolations and interpolations along isoelectronic, homologous, and Rydberg sequences are providing predictions for large classes of quantities, with a precision that is sharpened by subsequent measurements. Two examples are described.

34719 (CONF-830130—, pp 278-286) **Dielectronic recombination: recent results from ORNL.** Datz, S. (Oak Ridge National Lab., TN). 1983. NTIS, PC A13/MF A01.

From Workshop on atomic physics with fast heavy ion beams; Argonne, IL, USA (20 Jan 1983).

Results are presented in the form of graphs and notes without text. (GHT)

34720 (CONF-830449—2) **Relativistic many-body theory of atomic structures.** Cheng, K.T. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 4p. NTIS, PC A02/MF A01. Order Number DE83011722.

From DOE contractors workshop; Oak Ridge, TN, USA (21 Apr 1983).

The main objective of this program is to improve our understanding of the effect of relativity and electron correlations on atomic processes. Current efforts include hyperfine structure (hfs) studies using the multiconfiguration Dirac-Fock (MCDF) technique. Atomic hfs are known to be sensitive to relativity and electron correlations, and provide important tests of relativistic atomic many-body theories. Preliminary results on the hfs of the $4f^{12}\ ^3H$ ground state of $_{68}Er^{167}$ are shown and are in good agreement with experiment. This shows that the MCDF technique can be an efficient and powerful method for atomic hfs studies. Further tests of this method are in progress. We are also studying the absorption spectra for Xe-like ions in the region of 4d $\rightarrow$ nf, ef transitions.

34721 (INIS-mf—7626(Vol.2), pp vp) **Scattering of polarized low-energy electrons by ferromagnetic metals.** Helman, J.S. (Instituto Politecnico Nacional, Mexico City. Centro de Investigacion y de Estudios Avanzados:. 1981. NTIS (US Sales Only), PC A05/MF A01. (CONF-800155—Vol.2).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

A source of spin polarized electrons with remarkable characteristics based on negative electron affinity (NEA) GaAs has recently been developed. It constitutes a unique tool to investigate spin dependent interactions in electron scattering processes. The characteristics and working principles of the source are briefly described. Some theoretical aspects of the scattering of polarized low-energy electrons by ferromagnetic metals are discussed. Finally, the results of the first polarized low-energy electron diffraction experiment using the NEA GaAs source are reviewed; they give information about the surface magnetization of ferromagnetic Ni (110). (Author).

34722 (INIS-mf—7626(Vol.2)) **Proceedings of the sixth symposium on theoretical physics. Solide state, biophysics and chemical physics.** Ferreira, E.M.; Koiller, B. (eds.). (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, Rio de Janeiro (Brazil)). 1981. 74p. (CONF-800155—Vol.2). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780490.

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

Abstracts of individual items from the conference were prepared separately for the data base. (GHT)

34723 **(INIS-mf—7675) Spin polarization effects in low-energy elastic electron scattering.** Beerlage, M.J.M. (Vrije Univ., Amsterdam (Netherlands)). 2 Jun 1982. 146p. NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780488.

Thesis. Includes Dutch summary; 136 refs.; Includes previously published material.

This work describes experiments on the role of spin polarization in elastic electron scattering. Chapter I introduces the topic and in chapter II elastic scattering of 10-50 eV electrons from Ar and Kr in the angular range between 40° and 110° is studied. Noble gases have been chosen as targets in view of their relative theoretical simplicity. Below 25 eV scattered intensities measured by various authors exhibit severe disagreements. However, in the entire energy range, the spin polarization results can reasonably well be used to point out the shortcomings of the available theoretical data. The main topic of chapter III is the first attempt to determine the magnitude of a polarization phenomenon - in elastic electron scattering from the optically active camphor molecule - of which the existence has recently been predicted qualitatively from the absence of parity symmetry in such molecules. Besides these studies on gaseous targets the author has initiated a scattering experiment on crystal surfaces, using spin polarized electrons. Within the framework of this project a large new experimental arrangement has been built up. It consists of a spin polarized electron source and a LEED scattering chamber. Design, construction and test results, showing the usefulness of the set-up, are described in the last chapter.

34724 (INIS-SU—125, pp vp) **Intensities of Auger KL L transitions in $_{78}^{194}$Pt.** Babenkov, M.I.; Bobykin, B.V.; Zhdanov, V.S. 1982. (In Russian). NTIS (US Sales Only), PC A25/MF A01.

From 32. Conference on nuclear spectroscopy and nuclear structure; Kiev (Ukrainian SSR) (16 - 18 Mar 1982).

Short note.

34725 (INIS-SU—144, pp vp) **Quadrupole polarizability of atoms and ions.** Kavchuk, V.N. 1981. (In Russian). NTIS (US Sales Only), PC A05/MF A01.

9 refs.

In Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection.

Polarizability of electron shells of the atom or ion by the quadrupole nucleus moments is considered. A simple method for polarizability accountancy based on the "usual" Hartree-Fock method and applying operators equivalent as far as the matrix values are concerned as well as the notion of the effective orbital quantum number is suggested. It is shown that the applied method results in the dependence of radial orbitals on the projection of the orbital moment on the separated axis similarly to the "unlimited" Hartry-Fock method.

34726 **(IPPJ—532) Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy.** Ohyama, T.; Itikawa, Y. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Aug 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701206.

Total charge transfer cross sections are calculated for the collisions of Li^{3+} and Be^{4+} ions with H(1s) atoms in the low energy region ($E < 25$ keV/amu). The perturbed-stationary-state method in the impact parameter approximation is used with a basis set of adiabatic one-electron two-center molecular orbitals. For the Li^{3+}-H system, a reasonable agreement is found between the present calculation and the recent experiment.

34727 **(N—8230539) Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy.** Malvicini, C. (National Aeronautics and Space Administration, Washington, DC (USA)). Jul 1982. 16p. (NASA-TM—76936). NTIS, PC A02/MF A01.

The theory underlying the coherent antistokes Raman scattering (CARS) process is reviewed and the experimental arrangement required to record the spectra of CO, CO_2, H_2O, N_2, and O_2 in cells heated to 1800 K is described. The antistokes signal is analyzed spectrally with a monochromator. Combining with this instrument a vidicon or an array of photodiodes, the entire rotovibrational spectrum of a molecular species is obtained with a single laser shot.

34728 **Intracavity absorption line shape and the super-regen model.** Lewellen, L.R.; Brink, G.O. (State Univ. of New York, Buffalo). *Optics Communications;* **39**: No. 3, 159-162(1 Oct 1981). Contract AC02-77ER04448.

Intracavity absorption has been observed in a short lived excited state of helium produced in an RF discharge inside the dye laser cavity. The line shape consists of an absorption feature with two symmetric enhancement wings. The central absorption feature is considerably broadened over the natural width, and this is shown to be in agreement with the super-regen model. It is also shown that under certain conditions the ICA signal inverts so that the central feature becomes enhanced and the symmetric wings appear as absorption. This result is also in agreement with predictions of the model.

34729 **Photodetachment cross sections for $He^-(^4P^0)$.** Compton, R.N.; Alton, G.D.; Pegg, D.J. (Oak Ridge National Lab., TN). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **NS-28**: No. 2, 1198-1202(Apr 1981). Contract W-7405-ENG-26.

We report the first measurements of photodetachment cross sections for He^- (formed through charge exchange of He^+ with Ca vapor) over the photon energy range from 1.77 to 2.75 eV. The energies of autodetached electrons from the metastable He^- beam have also been determined for the first time. The autodetached electron energy agrees within experimental error (+-0.25 eV) with the known $1s2s2p)^4P^0$ He^- energy level. This taken with measurements for the lifetime of He^- infers that charge exchange of He^+ with Ca vapor produces $^4P^0$ He^-.

34730 **Lifetimes of low-lying $^2P^0$, ^2D, and $^2F^2$ states of the Al I isoelectronic sequence.** Fischer, C.F. (Vanderbilt Univ., Nashville, TN). *Physica Scripta;* **23**: 38-44(1981).

Theoretical lifetimes for some low-lying levels of the Al I isoelectronic sequence are reported for Al I to Ar VI, computed from multiconfiguration Hartree Fock wavefunctions. The differing lifetime patterns are proposed as an explanation for the better agreement between theoretical and beam-foil lifetimes for the lower $(3s^2\,3d,\ 3s3p^2)^2D$ state than for the upper. Possible important cascade effects are discussed.

34731 **New adiabatic approach to the photodissociation of polyatomic molecules.** Kresin, V.Z.; Lester, W.A. Jr. (Lawrence Berkeley Lab., CA). *International Journal of Quantum Chemistry, Symposium;* **15**: 703-714(1981). Contract W-7405-ENG-48.

An adiabatic theory of polyatomic photodissociation is developed that explicitly treats the interaction between the relative and internal motion and leads to an expression for the nuclear wavefunction of the final dissociative state which differs considerably from the zeroth-order distorted-wave approximation. The vibrational frequencies ω/sub i/ of the fragments are found to depend on the interfragment distance. In the evaluation of the matrix element needed to describe the energy distribution of the fragments, it is found necessary to use values of ω/sub i/ different from the frequencies of the free fragments. These values of ω/sub i/ can be expressed in terms of the force constants of the precursor system. Inverse vibrational distributions are obtained from this theory in accord with recent experimental data.

34732 **Quasiperiodic and stochastic behavior in molecules.** Noid, D.W. (Oak Ridge National Lab., TN); Koszykowski, M.L.; Marcus, R.A. *Annual Review of Physical Chemistry;* **32**: 267-309(1981).

This paper reviews recent theoretical studies on the quasiperiodic and chaotic dynamical aspects of vibrational states contained in 198 references and describes how those studies may be related to intramolecular randomization. Classical mechanical devel-

opments in anharmonic systems are reviewed. Suggestions as to what constitute analogous regular and chaotic quantum mechanical behavior are compared. The ways in which this difference in behavior may or may not be revealed in experimental observations are considered. Related work on spectral properties, including calculations of a classical power spectrum from a classical trajectory, a comparison with the aid of semiclassical ideas with the quantum mechanical power spectrum of the same variable, and some discussion of local versus nonlocal modes of vibration are reviewed. Some recent classical trajectory studies are cited and applications of techniques and phenomena discussed early in the review are presented. Some of the controversies and uncertainties still existing in this field of study are addressed. (BLM)

34733 **Rules for S(-2k) dipole sums.** Yoffe, J.A. (Univ. of Kansas, Lawrence); Maggiora, G.M.; Amos, A.T. *Theoretica Chimica Acta;* **58**: 137-144(1981).

Stieltjes conditions and the ratio test provide necessary but not sufficient conditions on S(-2k) dipole sums. If the dipole sums are accurate the associated [n,n-1]Pade approximant provides a better representation of $\alpha(\omega)$, the frequency-dependent dipole polarizability, than a truncated series expression and, in addition, should bound $\alpha(\omega)$ below. It is shown how constraints on the dipole sums effect the form of the [2,1] Pade approximant and an additional constraint is derived that ensures the analyticity of the approximant on $0 \leqq \omega < \omega_1$. There then follows a discussion of the reliability of available literature dipole sum values for small molecules containing H, C, N and O.

6404 Fluid Physics

REFER ALSO TO CITATION(S) 34020

34734 (CONF-820331—, pp 68-76) **Corona stabilization in SF_6/N_2 mixtures under impulse conditions.** Nelson, J.K. (Rensselaer Polytechnic Inst., Troy, NY); Chatterton, P.A.; Blomquist, N.H. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The use of optical multichannel analysis is described to quantify the establishment of corona in a positive point/plane electrode gap for 50/50 SF_6/N_2 gas mixtures. The system permits spatial and temporal resolution of the emitted light and, in conjunction with other measurements, provides evidence on the mechanism of corona stabilization for a range of presures and step voltages up to breakdown. On the basis of the optical results a tentative model is advanced based on the establishment of a collaborative streamer cloud from which individual streamers emanate. Aspects of this work call into question the true interpretation of the critical pressure.

34735 (CONF-820331—, pp 97-101) **dc and pulse components of positive corona current from two interacting needles in air.** Abdel-Salam, M.; Abdel-Fattah, A.; Saied, M.M.; Tharwat-El-Mohandes, M. (Assiut Univ., Egypt). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

Further measurements have been made of current against the applied voltage with positive polarity in the two interacting needles-to-plane corona discharge in laboratory air. This current showed three distinct components: (1) a dc-component, (2) a high-frequency component, and (3) a low-frequency component due to capacitive coupling between the needles and their stand with respect to the grounded plate. An experimental arrangement is provided to compensate for the low-frequency component of the corona current. The repetition rate and the average-value of the high-frequency component as well as the dc-component of the corona current are determined for different applied voltages. The dependence of both the dc and the high-frequency pulse components on the gap geometry is also examined. It has been observed that the dc component of the current satisfies the relation $I=C(V-V_0)$ at voltages close to the onset value (V_0). Similar relation holds also when the pulses of the high-frequency component starts its flickering. This behavior will be discussed in the light of the physics of gas discharges.

34736 (CONF-820331—, pp 119-127) **Dielectric strength of electronegative gases in non-uniform field: role of the vibrational excitation.** Bastien, F.; Marode, E. (CNRS Ecole Superieure d'Electricite, Gif-sur-Yvette, France). 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

The gas breakdown in non-uniform field and electronegative gases is studied with a set of equations taking into account the spatio-temporal charges of the conductivity along the discharge axis and the radial loss of neutral species due to hydrodynamic process. The role of the electron energy dissipation into molecules vibrationally excited is considered.

34737 (IPPJ—535) **Interaction of ion-acoustic solitons in multi-dimensional space, 2.** Kako, F.; Yajima, N. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Aug 1981. 39p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701207.

Numerical computations are made to study the collision process between two cylindrical or spherical solitons. The soliton resonance is found to play an important role in collision processes between two curved solitons as well as between two plane solitons.

34738 (LBL—15468) **Existence criteria for fluid interfaces in the absence of gravity.** Concus, P. (Lawrence Berkeley Lab., CA (USA)). Dec 1982. Contract AC03-76SF00098. 12p. (CONF-8210143—1). NTIS, PC A02/MF A01. Order Number DE83012440.

From Symposium on waves on fluid interfaces; Madison, WI, USA (18 Oct 1982).

We consider here equilibrium interfaces between two fluids, such as the liquid-gas free surface of a liquid that partly fills its container. The shape of the equilibrium free surface is determined by the interaction of surface and gravitational forces, in such a manner that the mechanical energy of the configuration is stationary with respect to displacements that satisfy prescribed constraints. Of principal interest are stable equilibria, for which the energy is minimized. Attention is focussed on cylindrical containers of general section. A number of interesting - in some cases striking - results have been uncovered in recent years, most pronounced for the situation in which gravity is absent. We consider a cylindrical container with axis oriented vertically. Some of the advances and current investigations on this problem are highlighted. (WHK)

34739 (LBL—15646) **Specific heat of ^{3}He in the Fermi-liquid region.** Mayberry, M.C.; Phillips, N.E. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 20p. (CONF-830456—3). NTIS, PC A02/MF A01. Order Number DE83011566.

From Symposium on quantum fluids and solids; Sanibel Island, FL, USA (11 Apr 1983).

A CMN thermometer has been calibrated by nuclear-orientation thermometry at low temperatures and He vapor-pressure thermometry at high temperatures. The calibration agrees well with the NBS temperature scale between 100 and 200 mK. Specific-heat data on ^{3}He in the Fermi-liquid region obtained with this thermometer are in good agreement with recent measurements at Bell Laboratories. It is argued that discrepancies with other data can be understood on the basis of errors in the temperature scales on which they are based.

34740 (N—8232059) **Phase separation in transparent liquid-liquid miscibility gap systems.** Gelles, S.H.; Bhat, B.N.; Laub, R.J. (Gelles (S.H.) Associates, Columbus, OH (USA)). 1979. 13p. NTIS, PC A12/MF A01.

A program to be carried out on transparent liquid-phase miscibility gap materials was developed for the purpose of acquiring additional insight into the separation process occurring in these systems. The transparency feature allows the reaction to be viewed directly through light scattering and holographic methods.

34741 (N—8232064) The migration of fluid droplets and their interactions in a thermal gradient. Subramanian, R.S.; Wilcox, W.R. (Clarkson Coll. of Tech., Potsdam, NY (USA)). 1979. 5p. NTIS, PC A12/MF A01.

When materials are processed in free fall, buoyant forces will be substantially reduced. Thus, the buoyant migration of droplets and bubbles which normally occurs on earth is expected to be overshadowed by migration due to other mechanisms in space processing. In particular, capillary forces on droplets due to the variation of interfacial tension around their periphery will play a significant role in governing their motion in space. While such interfacial tension gradients can be caused by thermal, compositional, and/or electrical gradients in the continuous phase, thermal gradients are convenient to use in controlled experimentation. On earth, due to interference from buoyant effects, it is difficult to study thermocapillary migration in sufficient detail. Also, the effects of a thermal gradient on the interactions among droplets are hard to study on Earth. Thus, an orbital facility for conducting experiments on the migration and interactions of fluid droplets in a continuous phase due to the action of a thermal gradient appears attractive.

34742 Simulation of polar and polarizable fluids. Alder, B.J.; Pollock, E.L. (Lawrence Livermore National Lab., CA). *Annual Review of Physical Chemistry;* **32**: 311-329(1981). Contract W-7405-ENG-48.

The present status of computations of the dielectric properties of fluids, both static and dynamic, are reviewed. The experimental, theoretical, and computational problems in the various aspects of this field are critically assessed. Nonpolar polarizable systems are discussed with respect to their dielectric and light scattering properties, and the slightly more complex systems in which a single charged or dipolar impurity is introduced in these nonpolar polarizable systems is also treated. 47 references. (BLM)

6450 High Energy Physics

34743 (INIS-SU—157) Proceedings of the international seminar on high energy physics and quantum field theory. Vol. 1. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1981. 370p. (CONF-8107105—Vol.1). NTIS (US Sales Only), PC A16/MF A01. Order Number DE83780521.

From 4. internattional seminar on high energy physics and quantum field theory; Protvino, USSR (1 Jul 1981).

Separate abstracts were prepared for papers from the International Seminar on High Energy Physics and Quantum Field Theory. (KAW)

34744 Particles and fields - 1982. Caswell, W.E.; Snow, G.A. (eds.). New York, NY; American Institute of Physics (1983). 431p. (CONF-8210113—). American Institute of Physics, 335 East 45th St., New York, NY 10017.

From American Physical Society meeting on particles and fields; College Park, MD, USA (28 Oct 1982).

The papers presented were entered into the data base separately. (WHK)

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 34194

34745 (ANL-HEP-CP—82-67) Probes of initial-state interactions in dilepton angular distributions. Ralston, J.P.; Pire, B. (Argonne National Lab., IL (USA); Stanford Linear Accelerator Center, CA (USA)). 1982. Contract W-31-109-ENG-38. 15p. (CONF-8210107—5). NTIS, PC A02/MF A01. Order Number DE83010708.

From Workshop on Drell-Yan processes; Batavia, IL, USA (7 Oct 1982).

We discuss the angular distribution of dileptons d σ/d^{4}Qd OMEGA, emphasizing phase sensitivity as a probe of initial-state interactions in QCD. The coherent nature of Sudakov effects is discussed, along with the presence of imaginary parts related by analyticity. Angular-distribution structure functions which describe interference between longitudinal and transverse virtual photons, e.g., can be used to probe phase differences that depend on large momenta. These evolve according to exp(ic ln ln(Q^2/lambda/sub QCD^2)) where Q^2 is a large scale. We report on a complete calculation at O(α/sub s/^{2}) of the q anti q $\rightarrow$ γ^* + gluons channel which confirms the cancellation of small (cutoff) scales, and describe a complementary experiment involving spin. We discuss the limit x $\rightarrow$ 1 of the distribution d σ/dQ^{2}dxdcos θ, and point out an unusual and interesting effect that a momentum-dependent phase can produce here.

34746 (BNL—32855) Glueballs in the reaction πp p $\rightarrow$ phi phi n. Lindenbaum, S.J. (Brookhaven National Lab., Upton, NY (USA); City Coll., New York (USA)). 1983. Contract AC02-76CH00016. 29p. (CONF-830140—2). NTIS, PC A03/MF A01. Order Number DE83011647.

From 18. Rencontre de Moriond conference; La Plagne, France (23 Jan 1983).

Portions are illegible in microfiche products.

The BNL/CCNY group has observed and performed a partial wave analysis on 1203 (22 GeV) π^-p $\rightarrow$ phi phi n events. The OZI suppression has been found to be almost completely broken down. The phi phi spectrum is found to be composed almost entirely of two new resonances, the g/sub T/(2160) and the g/sub T/(2320) with K/sup G/J/sup PC/ = 0$^+$2^{++}. For g/sub T/ (2160), M = 2.16 +- 0.05 GeV, and GAMMA = 0.31 +- 0.07 GeV. For g/sub T/(2320), M = 2.32 +- 0.04, and GAMMA = 0.22 +- 0.07. Assuming (1) QCD is correct, and (2) the OZI rule is universal for weakly coupled glue in disconnected Zweig diagrams due to the creation or annihilation of new types of quarks; it is concluded that one or two primary glueballs with the above quantum numbers are responsible for the above observed states. 42 references.

34747 (BNL—32901) Detecting heavy flavors at CBA. Aronson, S.; Ogilvie, M.; Stumer, I.; Tanaka, M.; Wanderer, P. (Brookhaven National Lab., Upton, NY (USA)). Mar 1983. Contract AC02-76CH00016. 10p. NTIS, PC A02/MF A01. Order Number DE83012216.

Portions are illegible in microfiche products.

In the CBA luminosity range (L approx. = 10^{33}-10^{35}cm^{-2}sec^{-1}) the expected rate of bare heavy flavor production is high enough to allow for detection schemes which rely on relatively small leptonic branching ratios. These provide a clean separation of the signal from the gluon plus light quark background, while retaining sufficient statistics for further study. The current status of the investigation of lepton-related triggers and cuts is presented, and the jet topologies of events (both signal and background) with high-P/sub T/ leptons are discussed. While these studies have been carried out with samples of high-P/sub T/ q anti q and gluon jets generated with ISAJET, other sources of heavy flavor production at CBA are surveyed.

34748 (BNL—32920) Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum. Akesson, T.; Albrow, M.G.; Almehed, S. (Brookhaven National Lab., Upton, NY (USA); European Organization for Nuclear Research, Geneva (Switzerland); Niels Bohr Inst., Copenhagen (Denmark); Lund Univ. (Sweden); Pennsylvania Univ., Philadelphia (USA); Science Research Council, Chilton (UK). Rutherford and Appleton Labs.; Tel Aviv Univ. (Israel)). 1982. Contract AC02-76CH00016. 38p. (CONF-820718—37). NTIS, PC A03/MF A01. Order Number DE83012212.

From 21. international conference on high energy physics; Paris, France (29 Jul 1982).

A sample of proton-proton collisions at $\sqrt{s}$ = 63 GeV with a (trigger) charged particle of transverse momentum in the range 4 to 12 GeV/c and vertical bar rapidity vertical bar < 1 is studied. The events were obtained with the Axial Field Spectrometer at the CERN ISR (experiment R807). Preliminary results are reported from an investigation of the distribution of the transverse momentum vectors of the observed charged particles in the central rapidity region associated with the trigger particle. It is found that the pattern of transverse momentum vectors of the observed charged

particles in the central rapidity region associated with the trigger particle. It is found that the pattern of transverse momentum vectors of the charged particles observed in a given event is strongly dependent on the amount of transverse energy which is carried by the associated charged particles observed in the event. When the transverse energy is large (> 10 GeV/c within vertical bar rapidity vertical bar < 1), a large fraction (~ 50%) of the events have the transverse momentum vectors of the associated charged particles collimated in narrow jets around an axis close in azimuth (within ~ 20°) to the trigger particle.

34749 **(BONN-HE—82-11) Two photon physics with the TASSO detector.** Kolanoski, H. (Bonn Univ. (Germany, F.R.). Physikalisches Inst.). May 1982. 10p. (CONF-820371—7). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750106.

From 17. Rencontre de Moriond meeting; Les Arcs, Savoie, France (14 Mar 1982).

Two selected topics on two photon physics from the TASSO experiment are presented: the two photon production of proton-antiproton pairs and the two photon production of rho°rho°. The reaction $\gamma\gamma \rightarrow$ panti p has been measured in the panti p mass range from 2.0 GeV to 3.0 GeV. The data are compared to predictions from perturbative QCD. A new analysis of the reaction $\gamma\gamma \rightarrow$ anti p°anti p° $\rightarrow 2\pi^+ 2\pi^-$ has been performed for 1.2 GeV <= M$_4$sub(π) <= 2.0 GeV. The cross section is flat from 1.2 to 1.7 GeV and then drops off towards higher energies, with no obvious resonance structure around 1.5 GeV. An analysis of the angular correlations of the four pions excludes dominant contributions from resonances with Jsup(P) = 0^- or 2^-. The large cross section cannot be explained by known resonances.

34750 **(LBL—91-Rev(2)) Current experiments in elementary-particle physics.** Wohl, C.G.; Armstrong, F.E.; Rittenberg, A. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 42p. NTIS, PC E03/MF A01. Order Number DE83011259.

Portions are illegible in microfiche products. Original copy available until stock is exhausted. Includes 1 sheet of 48x reduction microfiche.

Microfiche are included which contain summaries of 479 experiments in elementary particle physics. Experiments are included at the following laboratories: Brookhaven (BNL); CERN; CESR; DESY; Fermilab (FNAL); Institute for Nuclear Studies (INS); KEK; LAMPF; Serpukhov (SERP); SIN; SLAC; and TRIUMF. Also, summaries of proton decay experiments are included. A list of experiments and titles is included; and a beam-target-momentum index and a spokesperson index are given. Properties of beams at the facilities are tabulated. (WHK)

34751 (LBL—14986, pp 44-45) **Correlated neutron-proton emission in relativistic heavy-ion interactions.** Frankel, K.A.; Schimmerling, W.; Rasmussen, J.O. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

Two types of models, the coalescence model and thermal equilibrium model have been in use to systematize the existing data on inclusive cross sections for the production of neutrons, protons, and light fragments. In turn, the relative abundances of neutrons, protons, and low mass composite nuclei have been used to test and refine these models. A preliminary measurements has been performed at the Bevalac of coincident neutrons and protons produced by relativistic neon ions incident on uranium. Charged particles were identified by their time of lfight and their momentum (as determined in a magnetic spectrometer). Neutral particles were detected using a thick plastic scintillator, and their time of flight was measured between an entrance scintillator, triggered by the charged particle, and the neutron detector.

34752 (LBL—14986, pp 45-47) **Transport studies of the interaction of high-energy heavy ions with extended matter.** Wong, M.; Schimmerling, W.; Wilson, J.W. Apr 1983. NTIS, PC A08/MF A01.

In Biology and Medicine Division annual report, 1981-1982.

The development of a theory for the transport of high-energy heavy ions through extended matter is crucial to our understanding of the effect of nuclear fragmentation processes on radiobiological studies and medical applications underway at this laboratory. To this end, a formulation using the Boltzmann equation and perturbation theory is being applied to the heavy-ion transport problem. Using this analytical method, a computer code has been developed that can be used to calculate the depth-dose relationship for heavy ions incident on bulk material, and to provide a quantitative description of the beam fluence, including the contribution arising from produced nuclear fragments, as a function of depth and particle energy.

34753 **(SLAC—255) Charmonium spectroscopy from radiative decays of the J/psi and psi'.** Gaiser, J.E. (Stanford Linear Accelerator Center, CA (USA)). Aug 1982. Contract AC03-76SF00515. 205p. NTIS, PC A10/MF A01. Order Number DE83011922.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Thesis.

The Crystal Ball NaI(Tl) detector was used to study the photon spectra from the following inclusive charmonium decays: $e^+e^- \rightarrow$ J/psi $\rightarrow \gamma$ + hadrons and $e^+e^- \rightarrow$ psi' $\rightarrow \gamma$ + hadrons. Data were collected at the Stanford Linear Accelerator Center's electron-positron colliding beam machine, SPEAR. The Crystal Ball detector consists of a highly segmented array of 732 NaI(Tl) crystals (16 radiation lengths) covering $\approx$ 98% of 4π steradians, and is used to measure the photon energies, directions, and lateral shower distributions. This detector is excellently suited for studying the radiative transitions among the charmonium family of states: (1) from psi' to the triplet P states, chi(3415), chi (3510), chi(3550); (2) from psi' and J/psi to the singlet S state eta/sub c/(2984); and (3) from psi' to the radially excited singlet S state eta'/sub c/(3592). The analysis of 1.8 x 10^6 psi' and 2.2 x 10^6 J/psi decays yields the following spectrum of states: chi$_0$(3418), chi$_1$(3512), chi$_2$(3558), eta/sub c/(2984), and eta'/sub c/(3592), each with a +-4 meV error on its mass. The branching ratios are measured to be: B(psi' $\rightarrow \gamma$ chi$_{0,1,2}$) = (9.9 +- 0.5 +- 0.8)%, (9.0 +- 0.5 +- 0.7)%, and (8.0 +- 0.5 +- 0.7)%, respectively; B(psi' $\rightarrow \gamma$ eta/sub c/) = 0.28 +- 0.06)% and B(J/psi $\rightarrow \gamma$ eta/sub c/) = 1.27 +- 0.36)%; and B(psi' $\rightarrow \gamma$ eta'/sub c/) = (0.5-1.2)% at the 90% confidence level. Values for the natural line widths are obtained: Γ(chi$_{0,1,2}$) = (13.5-20.4) MeV, < 3.8 MeV, (0.85-4.9) MeV, respectively (90% C.L.); Γ(eta/sub c/) = 11.5 +4.5/-4.0) MeV; and Γ(eta'/sub c/) < 7 MeV (90% C.L.). Cascade product branching ratios B(psi' $\rightarrow \gamma$ chi/sub J/).B(chi/sub J/ $\rightarrow \gamma$J/psi) were measured for J = 1 and 2 to be: (2.56 +- 0.12 +- 0.20)% and (0.99 +- 0.10 +- 0.08)% respectively. No signal was seen for the J = 0 transition.

34754 **Multigamma-ray events at the CERN ISR.** Dell, G.F.; Yuan, L.C.L. (Brookhaven National Lab., Upton, NY (USA)); Roberts, L.E.; Dooher, J. (Adelphi Univ., Garden City, NY (USA)); Amaldi, E.; Beneventano, M.; Borgia, B.; Capone, A.; De Notaristefani, F.; Dore, U. *Nuclear Physics [Section] B;* 209: No. 1, 45-55(20 Dec 1982).

Results of a search for multigamma-ray events at $\sqrt{s}$ = 52 GeV in pp collision are reported. The results are compared with a Monte Carlo simulation of the decay of pairs of heavy mass particles by gamma-ray emission, and upper limits for the production cross section are determined.

6452 Particle Interactions And Properties - Theoretical

REFER ALSO TO CITATION(S) 34747, 34766

34755 **(BONN-HE—82-9) Diffraction scattering of strongly bound system.** Kuzmichev, V.E. (Bonn Univ. (Germany, F.R.). Physikalisches Inst.). Apr 1982. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750105.

The scattering of a hadron on a strongly bound system of two hadrons (dihadron) is considered in the high-energy limit for the relative hadron-dihadron motion. The dihadron scatterer motion and the internal interaction are included in our consideration. It is shown that only small values of the internal transfer momentum of dihadron particles bring the principal contribution to the three-particle propagator in eikonal approximation. On the basis of the exact analytical solution of the integral equation for the total

Green function the scattering amplitude is derived. It is shown that the scattering amplitude contains only single, double, and triple scattering terms. The three new terms to the Glauber formula for the total cross section are obtained. These terms decrease both the true total hadron-hadron cross section and the screening correction.

34756 **(DOE/ER/40048—25-P2) Quark fragmentation and the determination of α/sub s/.** Ellis, S.D. (Washington Univ., Seattle (USA). Dept. of Physics). 1982. Contract AC06-81ER40048. 4p. (CONF-8208134—1). NTIS, PC A02/MF A01. Order Number DE83011618.

From 21. international conference on high energy physics; Paris, France (1 Aug 1982).

Portions are illegible in microfiche products.

It is noted that the specific physics assumptions implicit in various Monte Carlo schemes used to simulate parton fragmentation are different and these differences can lead to differing results for questions of physical significance, for example, the magnitude of α/sub s/.

34757 **(DOE/ER/40048—26-P2) Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland.** McLerran, L. (Washington Univ., Seattle (USA). Dept. of Physics; Helsinki Univ. (Finland). Research Inst. for Theoretical Physics). 1982. Contract AC06-81ER40048. 26p. (CONF-8208133—1). NTIS, PC A03/MF A01. Order Number DE83011617.

From Arctic school of physics; Akaslampalo, Finland (1 Aug 1982).

Portions are illegible in microfiche products.

These lectures present features of high temperature and baryon number density hadronic matter as it might be described by QCD, and describe the possible formation of such matter in ultra-relativistic nucleus-nucleus collisions. The confinement-deconfinement transition, and the chiral symmetry breaking transition are discussed using order parameters. The current understanding of the dynamics of these phase changes is reviewed. The first lecture begins by presenting naive arguments for expecting phase transitions at several times the energy density of hadronic matter. These phase transitions are then discussed in terms of order parameters. For Yang-Mills theories in the absence of dynamical quarks the exponential of the negative of the free energy of an isolated static test quark is employed to measure the confinement-deconfinement phase transition. The chiral symmetry restoration transition is extensively discussed. The dynamic of these phase transitions, and the relationship between confinement-deconfinement and the breakdown or realization of a global dynamical Z/sub N/ symmetry, is the subject of the second lecture. The dynamics of chiral symmetry breaking is discussed. The last lecture reviews how hadronic matter might be formed in ultra-relativistic nuclear collisions. The space time dynamics of the Landau hydrodynamical model and the inside-outside cascade model are reviewed. (WHK)

34758 **(FERMILAB-Pub—83/25-THY) Topics in quarkonium physics.** Quigg, C. (Ecole Normale Superieure, 75 - Paris (France). Lab. de Physique Theorique; Fermi National Accelerator Lab., Batavia, IL (USA)). Feb 1983. Contract AC02-76CH03000. 91p. (CONF-8206186—1). NTIS, PC A05/MF A01. Order Number DE83011059.

From 22. Krakow school of theoretical physics; Zakopane, Poland (1 Jun 1982).

Portions are illegible in microfiche products.

The state of hadron spectroscopy in general and of heavy quark-antiquark bound states in particular is briefly reviewed. The first lecture is devoted to a summary of elementary techniques of quarkonium quantum mechanics. The second is concerned with inverse-scattering techniques. Throughout, the implications of recent data are assessed.

34759 **(IC—81/120) QCD sum rules of the Laplace transform type for the gluon component of the U(1)sub(A) meson mass.** Narison, S. (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1981. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701180.

We get upper bound of the gluon component of the U(1)sub(A) meson mass using QCD sum rules of the Laplace transform type to the two-point functions associated to the divergence of the U(1)sub(A) current in the chiral limit. For Λ is approximately equal to 70 is approximately 210 MeV and fsub(eta') is approximately equal to (0.5 is approximately 0.7) sqrt 3 fsub(π), we obtain Msub(G) is approximately smaller to (0.6 is approximately 0.85) GeV, which indicates an important gluon contribution to the eta' mass.

34760 (INIS-mf—7626(Vol.3), pp vp) **Weak interactions.** Chanda, R. (Rio de Janeiro Univ. (Brazil). Inst. de Fisica). 1981. NTIS (US Sales Only), PC A09/MF A01. (CONF-800155—Vol.3).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

The theoretical and experimental evidences to form a basis for Lagrangian Quantum field theory for Weak Interactions are discussed. In this context, gauge invariance aspects of such interactions are showed.

34761 **(INIS-mf—7678) Gross properties of nuclei and nuclear excitations. Proceedings.** Feldmeier, H. (ed.). (Technische Hochschule Darmstadt (Germany, F.R.). Inst. fuer Kernphysik; Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 184p. (CONF-820120—). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83780492.

From International workshop on gross properties of nuclei and nuclear excitation; Hirschegg, Kleinwalsertal, Austria (18 Jan 1982).

Abstracts of individual items from the workshop were prepared separately for the data base. (GHT)

34762 (INIS-SU—144, pp vp) **Calculation of low-frequency asymptotics for Green functions of degenerate Bose-systems (kinetic approximation).** Skrypnik, V.P. 1981. (In Russian). NTIS (US Sales Only), PC A05/MF A01.

Microfiche only, copy does not permit paper copy reproduction refs.

In Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection.

The correction for the Bogolyubov energy spectrum in the system of weak interacting quasiparticles with the accuracy up to the second order by the parameter of effective interaction is determined. The kinetic asymptotics of the anomalous Green function in the mentioned approximation is calculated.

34763 **(INIS-SU—152) General and nuclear physics.** (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1981. 114p. (CONF-8105209—). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780520.

From All-union seminar electromagnetic interactions of hadrons in the resonance energy range; Khar'kov, Ukrainian SSR (26 May 1981).

Separate abstracts were prepared for papers from this USSR seminar on electromagnetic interactions of hadrons in the resonance energy range. (KAW)

34764 **Inelastic scattering of pions on nuclei with excitation of particle-hole states.** Vagradov, G.M.; Goj, A.A. (AN SSSR, Moscow. Inst. Yadernykh Issledovanij); Silbar, R.R. (Los Alamos Scientific Lab., NM (USA)). *Uspekhi Fizicheskikh Nauk;* **31**: No. 1, 128-136(Apr 1982). (In Russian).

The field theory methods are applied to pion-nucleus inelastic scattering with a small energy transfer. The particle-hole correlations in the amplitude are separated from other pion-nucleus interaction effects. Therefore the features of the amplitude of pion scattering by a bound nucleon can be found analysing the elastic and inelastic data for π^+ and π^- mesons. Applicability of the theory of finite Fermi systems to this problem is discussed.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 34757, 34766

34765 (DOE/ER/40008—33) B-L violating supersymmetric couplings. Ramond, P. (Florida Univ., Gainesville (USA). Dept. of Physics). 1983. Contract AS05-81ER40008. 15p. (CONF-830134—4). NTIS, PC A02/MF A01. Order Number DE83011584.

From Orbis scientiae conference; Miami, FL, USA (17 Jan 1983).

We consider two problems: one is the possible effect of the breaking of Peccei-Quinn symmetry on the inflationary universe scenario; the other is the remark that even the minimal supersymmetric SU_5 theory contains B-L violating couplings which give rise to neutrino masses and family-diagonal proton decay. However the strength of these couplings is limited by the gauge hierarchy.

6454 Field Theory

REFER ALSO TO CITATION(S) 34680, 34743, 34757, 34758, 34765, 34884

34766 (CONF-820371—9) Second Z in SO(10). Robinett, R.W.; Rosner, J.L. (Wisconsin Univ., Madison (USA). Dept. of Physics; Minnesota Univ., Minneapolis (USA). School of Physics and Astronomy). 1982. Contract AC02-82ER40051;AC02-76ER00881. 4p. NTIS, PC A02/MF A01. Order Number DE83011078.

From 17. Rencontre de Moriond meeting; Les Arcs, Savoie, France (14 Mar 1982).

Models based on SO(10) are presented in which a second Z ("Z_β") can have a mass as low as 230 GeV/c^2 without appreciably distorting the lower-energy picture. In such models the lightest Z("Z_α") is very close to the predicted mass in the standard picture, $1 \geq M(Z_\alpha)/M(Z_0) \geq 0.98$. The major constraint preventing $M(Z_\beta)$ from being even lower comes from experiments on parity violation in heavy atoms. Other properties of Z_β, and ways to discover it, are discussed.

34767 (CONF-820971—4) Minimally extended elctroweak gauge theories in SO(10) and E_6. Robinett, R.W.; Rosner, J.L. (Wisconsin Univ., Madison (USA). Dept. of Physics; Chicago Univ., IL (USA). Enrico Fermi Inst.). Nov 1982. Contract AC02-76ER00881. 5p. NTIS, PC A02/MF A01. Order Number DE83011077.

From Neutrino conference; Telemark, WI, USA (22 Sep 1982).

Portions are illegible in microfiche products.

The possibility of minimally extending the standard SU(2)/sub L/xU(1) electroweak theory within the context of SO(10) and E_6 grand unification by adding U(1) factors is explored. The neutrino neutral-current interactions in these schemes are arranged to coincide with the standard-model predictions. Limits on the masses of the extra Z's generated by these U(1) factors are obtained by considering other parity-violating effects. Additional Z's as light as 2.5 to 3.0 times the standard model Z^0 mass are allowed.

34768 (IC—80/158) Geon-type solutions of the non-linear Heisenberg-Klein-Gordon equation. Mielke, E.W.; Scherzer, R. (International Centre for Theoretical Physics, Trieste (Italy)). Oct 1980. 52p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701175.

As a model for a "unitary" field theory of extended particles we consider the non-linear Klein-Gordon equation - associated with a "squared" Heisenberg-Pauli-Weyl non-linear spinor equation - coupled to strong gravity. Using a stationary spherical ansatz for the complex scalar field as well as for the background metric generated via Einstein's field equation, we are able to study the effects of the scalar self-interaction as well as of the classical tensor forces. By numerical integration we obtain a continuous spectrum of localized, gravitational solitons resembling the geons previously constructed for the Einstein-Maxwell system by Wheeler. A self-generated curvature potential originating from the curved background partially confines the Schroedinger type wave functions within the "scalar geon". For zero angular momentum states and normalized scalar charge the spectrum for the total gravitational energy of these solitons exhibits a branching with respect to the number of nodes appearing in the radial part of the scalar field. Preliminary studies for higher values of the corresponding "principal quantum number" reveal that a kind of fine splitting of the energy levels occurs, which may indicate a rich, particle-like structure of these "quantized geons".

34769 (IC—80/181) New approach to unified field theories. Furlan, P.; Raczka, R. (International Centre for Theoretical Physics, Trieste (Italy)). Nov 1980. 67p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701176.

An idea that an internal symmetry group G is implied by a dynamical higher space-time symmetry group K of a given field theory is presented. Using this idea we have classified admissible simple Lie groups K and we have explicitly determined the internal symmetry group G implied by K. We have shown that the groups G are "quantized" and in this framework they are U(2), U(4), U(8)...U(2sup(N)), depending on the rank of K. We have also determined the boson and the fermion field content in considered models. The proposed formalism admits a new interesting mechanism of dynamical symmetry breaking which is different from the spontaneous breaking one.

34770 (IC—81/40) Non-existence of extended physical states in the Schwinger model. Magpantay, J.A. (International Centre for Theoretical Physics, Trieste (Italy)). Apr 1981. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701188.

We give a simple proof, using the canonical formalism, that there are no extended physical states in the massless Schwinger model.

34771 (IC—81/81) Montonen-Olive conjecture. Salam, A.; Strathdee, J. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701193.

Ways in which the conjecture of Montonen and Olive might be realized are discussed. The interesting possibility of a "self-dual" model is considered. Finally, the Osborn formula for the mass spectrum in N=4 super Yang-Mills theory is addressed.

34772 (IC—81/93) Commutativity of charge superselection rules in standard quantum field theory. Todorov, T.S. (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1981. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701194.

A concrete operator structure realization of charge superselection rules in the sense of Doplicher, Haag, Kastler and Roberts is discussed, based on a "foliation" of the sector in unitary equivalent "subsectors". It is particularly suited for nonabelian superselection rules (which exist e.g. in the presence of a nonabelian gauge symmetry group). Several equivalent characteristics of this case are given. They are interpreted in the nonabelian case as an indication of lack of physical information for a complete determination of the corresponding state vectors by the expectation values, or equivalently, as the appearance of "hidden" observables. Their possible qualification as usual observables is connected with breaking of the symmetry and the eventual introduction of new superselection rules and is also understood as a transition from an approximate to a full description of the physical system. So the symmetry here is a manifestation of an incomplete description, while the breaking of this symmetry (if physically admissible) corresponds to a fuller description. Elements from the language of fibre bundles are introduced.

34773 (IC—81/105) Quantum effective potential in S^1xR^3. Denardo, G.; Spallucci, E.; Doebner, H.D. (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1981. 48p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701178.

The functional integral formulation of quantum field theory is applied to the study of the vacuum state in spacetimes with S^1xR^3 topology. Such a global spacetime structure can be physically realized both in flat and in curved spacetime. In the first case one deals with finite temperature quantum field theories (if S^1 is time-like) or with field theories in a spacetime with a compact space dimension (if S^1 is spacelike). When curvature is present, a S^1

time-like dimension is induced by the Wick rotation whenever the metric is endowed with an event horizon, and this leads to the thermal nature of the vacuum in these cases. We shall take into account here only conformally flat spacetimes. Finally we discuss in some details the topological restoration of a spontaneously broken symmetry and the strictly related problem of the mass dynamical generation.

34774 **(IC—81/123) Natural embedding of Peccei-Quinn symmetry in flavor grand unification.** Kim, J.E. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1981. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701181.

Peccei and Quinn's global U(1)sub(A) symmetry can be embedded in grand unified schemes without an artificial requirement of imposing U(1)sub(A) symmetry, which results from the representation content of fermions and Higgs fields. Then, in some cases there results an ordinary axion with a mass approximately 100 keV. The axion mass is proportional to v^{-1}sub(A), where v^{-1}sub(A) is the scale of the actual U(1)sub(A) symmetry breakdown.

34775 **(IC—81/138) Reason for SU(6) grand unification.** Kim, J.E. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701182.

An SU(6) model can naturally guarantee strong CP invariance. This also includes Georgi and Glashow's SU(5) model. The axion in this model can be either invisible or visible, depending on the symmetry breaking scheme. The invisible axion is identical to a Majoron. Also, there exists a relationship between 24sub(H) and 45sub(H) of SU(5).

34776 **(IC—82/60) N-anti N oscillation in SO(10) and SU(6) supersymmetric grand unified models.** Fujimoto, Y.; Zhiyong, Z. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701196.

N-anti N oscillation in SO(10) and SU(6) S.G.U.M. is considered. We find a new type of diagram leading to a faster oscillation rate than in non-supersymmetric case. It is also noted that in SO(10) S.G.U.M. with intermediate SU(4)sub(C)xSU(2)sub(L)xSU(2)sub(R) symmetry N-anti N oscillation would be highly suppressed, which may not necessarily be the case for SU(6) S.G.U.M.

34777 **(IC—82/64) N=2 massive matter multiplet from quantization of extended classical mechanics.** Frydryszak, A.; Lukierski, J. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1982. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701197.

The recently proposed supersymmetric particle model invariant with respect to N-extended superPoincare group (N=2,4,...) is quantized. For N=2 the free supersymmetric quantized system is described by scalar massive matter multiplet (two complex KG scalar fields and Dirac spinor field, all with equal masses). In the proposed framework the Salam-Strathdee superfields describe the Schroedinger representation in first-quantized supersymmetric theory.

34778 (INIS-mf—7626(Vol.3), pp vp) **Gauge fields and unifying ideas.** Bollini, C.G. (Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro:. 1981. NTIS (US Sales Only), PC A09/MF A01. (CONF-800155—Vol.3).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

All the four kinds of known interactions are treated in a unifying way by utilizing the symmetry concepts of gauge fields.

34779 (INIS-mf—7626(Vol.3), pp vp) **Gauge unification of fundamental forces.** Salam, A. (International Centre for Theoretical Physics, Trieste (Italy)). 1981. NTIS (US Sales Only), PC A09/MF A01. (CONF-800155—Vol.3).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

Several theoretical predictions of unifications of fundamental forces, and the inner structure of elementary particles, through gauge theories, are reviewed and discussed. Symmetries and symmetry breaking of such theories are discussed as well.

34780 (INIS-mf—7626(Vol.3), pp vp) **Topological aspects in field theory and confinement.** Schroer, B. (Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica). 1981. NTIS (US Sales Only), PC A09/MF A01. (CONF-800155—Vol.3).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

The problems of confinement and screening in the context of quantum chromodynamics and Lagrangian field theory are reviews. It is shown that topology play an important role in such theories.

34781 **(INIS-mf—7626(Vol.3)) Proceedings of the sixth symposium on theoretical physics. Elementary particle physics and relativity.** Ferreira, E.M.; Koiller, B. (eds.). (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, Rio de Janeiro (Brazil)). 1981. 130p. (CONF-800155—Vol.3). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83780486.

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

Abstracts of individual items from the synmposium were prepared separately for the data base. (GHT)

34782 **(INS—427) Comment on the Adler-Bardeen theorem in non-Abelian gauge theories.** Fujikawa, Kazuo. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Sep 1981. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701198.

It is pointed out that the constructive proof of the Adler-Bardeen theorem for the chiral and scale (counting identity) anomalies in non-Abelian gauge theories proceeds just as in the spinor electrodynamics, although several interesting features characteristic of non-Abelian theories appear.

34783 **(INS—432) Path integral of relativistic strings.** Fujikawa, Kazuo. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Oct 1981. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701199.

The field theoretical aspects of the path integral for the string Lagrangian a la Polyakov are discussed. It is shown that the BRS symmetry is consistent with the conformal anomaly, and the generalized Virasoro condition arises from the BRS invariance. The ghost number current, however, contains an anomaly. The possible cancellation of the conformal degree of freedom by the Faddeev-Popov ghost at $D < 26$ is also discussed.

34784 **(RRK—81-13) Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric.** Fukuda, T.; Monda, M.; Takeda, M.; Yokoyama, K. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). May 1981. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701200.

Canonical quantum theory with indefinite metric is formulated for massive Yang-Mills fields. A set of new auxiliary fields is introduced in addition to the usual Lagrange multiplier and the Faddeev-Popov ghost fields. An exact BRS symmetry is established among all the relevant fields, by which unphysical modes in question are confined into unobservable world. The theory is expected to be renormalizable.

34785 **(RRK—81-16) Quantum theory of massive Yang-Mills fields, 2. Gauge covariance.** Fukuda, T.; Monda, M.; Takeda, M.; Yokoyama, K. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Jun 1981. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701201.

By generalization of a basic formulation presented in a preceding part of the same series, a massive Yang-Mills field theory with gauge covariance is formulated within one-parameter invariant gauge families. It is consequently concluded that all cases of different gauges belonging to the same gauge family are equivalent to one another in a rigorous field-theoretical sense.

34786 (RRK—81-19) Low energy behavior of a quantized scalar field in the linearly expanding universe. Azuma, T.; Tomimatsu, A. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Jul 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701202.

We study positive frequency mode solutions of a massive scalar field at an initial stage in the spatially flat, linearly expanding Robertson-Walker universe. The essential point is that the initial time is taken to be small enough, but non-zero (e.g., the Planck time), and the mode is determined by a kind of the WKB conditions. We calculate the created particle spectrum, and show that its low energy behavior is considerably different from the previous results.

34787 (RRK—81-21) Role of infrared phase factors in quantum electrodynamics. Kubo, R. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Jul 1981. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701203.

Infrared singularities in Green functions in quantum electrodynamics are studied from the point of view of path-ordered phase factors in an infrared approximation. The singular exponential factor in the vertex part is reproduced by a simple calculation of the phase factor. The result is compared with the one obtained by the Kulish-Faddeev model.

34788 (SLAC-PUB—2857) Quantum chromodynamics and hadronic interactions at short distances. Brodsky, S.J.; Huang, T.; Lepage, G.P. (Stanford Linear Accelerator Center, CA (USA); Academia Sinica, Beijing (China). Inst. of High Energy Physics; Cornell Univ., Ithaca, NY (USA). Lab. of Nuclear Studies). 1981. Contract AC03-76SF00515. 107p. (CONF-8108162—1). NTIS, PC A06/MF A01. Order Number DE83011839.

From Summer institute on particle physics meeting; Stanford, CA, USA (1 Aug 1981).

A brief introduction to QCD and asymptotic freedom is given. A new method to avoid scheme and scale ambiguities in perturbative QCD predictions is discussed. A detailed discussion of light-cone perturbation theory and the Fock state expansion of hadronic wavefunctions is given. The QCD equation of motion is also discussed. Measures of the hadronic wavefunction (form factors, magnetic moments, etc.), and the QCD analysis of high momentum transfer exclusive processes are discussed. It is also shown how meson distribution amplitudes can be measured in $\gamma\gamma \rightarrow$ M anti M reactions. The connection of the Fock state basis to leading and higher twist contributions to deep inelastic scattering is given. How many different QCD processes are interelated through the hadronic Fock states is discussed, and a novel type of QCD subprocess - direct coupled hadron-induced reactions is considered. A new prediction for the proton form factor is also given. Also, a simple phenomenology of hadron wavefunctions is introduced, and present constraints on the form and normalization of the valence meson and nucleon Fock states are discussed. An important conclusion is that the valence Fock state as defined at equal time or the light cone appears to have a significantly smaller radius than that of the physical hadron; higher Fock states thus play an essential role in low momentum transfer phenomenology. Applications to quark jet diffraction excitation and the hidden heavy quark Fock state structure of hadrons are also discussed. 83 references. (WHK)

6455 Scattering Theory

REFER ALSO TO CITATION(S) 34758

65 PHYSICS RESEARCH

6510 Nuclear Physics

REFER ALSO TO CITATION(S) 34853

34789 (BNL-NCS—51647) Thermal neutron capture gamma-rays. Tuli, J.K. (Brookhaven National Lab., Upton, NY (USA)). Jan 1983. Contract AC02-76CH00016. 167p. NTIS, PC A08/MF A01. Order Number DE83011768.

The energy and intensity of gamma rays as seen in thermal neutron capture are presented. Only those (n,α), E = thermal, reactions for which the residual nucleus mass number is $\geq$ 45 are included. These correspond to evaluations published in Nuclear Data Sheets. The publication source data are contained in the Evaluated Nuclear Structure Data File (ENSDF). The data presented here do not involve any additional evaluation. Appendix I lists all the residual nuclides for which the data are included here. Appendix II gives a cumulated index to A-chain evaluations including the year of publication. The capture gamma ray data are given in two tables - the Table 1 is the list of all gamma rays seen in (n,γ) reaction given in the order of increasing energy; the Table II lists the gamma rays according to the nuclide.

34790 (BNL-NCS—51655) Evaluated nuclear structure data file. A manual for preparation of data sets. Tuli, J.K. (Brookhaven National Lab., Upton, NY (USA)). Mar 1983. Contract AC02-76CH00016. 48p. NTIS, PC A03/MF A01. Order Number DE83011769.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This manual describes the organization and structure of the Evaluated Nuclear Structure Data File (ENSDF). This computer-based file is maintained by the National Nuclear Data Center (NNDC) at Brookhaven National Laboratory for the international Nuclear Structure and Decay Data Network. For every mass number (presently, A $\leq$ 263), the Evaluated Nuclear Structure Data File (ENSDF) contains evaluated structure information. For masses A $\geq$ 45, this information is documented in the Nuclear Data Sheets; for A $<$ 45, ENSDF is based on compilations published in the journal Nuclear Physics. The information in ENSDF is updated by mass chains with a present cycle time of approximately six years. The body of a data set is composed of numeric data records which describe the measured or deduced properties of levels, γ rays, α particles, etc. These records are associated with the level which decays (for gamma records) or the level which is populated (for beta, ec, or alpha records). Thus, each level record is followed by a group of records describing charged-particle decay into the level and γ-ray decay out of the level. (WHK)

34791 (BONN-HE—82-7) Photon induced reactions. Mecking, B.A. (Bonn Univ. (Germany, F.R.). Physikalisches Inst.). Apr 1982. 24p. (CONF-820475—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750108.

From Conference on new horizons on electromagnetic physics; Charlottesville, VA, USA (21 Apr 1982).

Various aspects of medium energy nuclear reactions induced by real photons are reviewed. Special emphasis is put on high accuracy experiments that will become possible with the next generation of electron accelerators.

34792 (KFK—3302) Final report on R + D works in 1981. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Zyklotronlaboratorium). Feb 1982. 32p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750053.

In the field of solid state physics the experimental and theoretical work aims at a better understanding of the microscopic and macroscopic properties of certain solids. Presently superconductors with high transition point, superionic conductors, amorphous materials, and alloys of transition metals are studied very intensively. Technologically relevant materials are comparatively preferred. The experimental methods of nuclear solid state physics are supplemented by the perfection of 'non-nuclear' experimental methods. In the field of the application-oriented nuclear physical work as contributions to the project control of the flax of fissile materials nondestructive methods for the determination of fissile materials are developped. Experiments with fast neutrons serve for the determination of cross sections which are necessary for the design of fast re-

actors and the understanding of the nucleosynthesis. Further fundamental research deals with nuclear reactions caused by high energy α-particles and ^{6}Li-ions. Furthermore by laser-spectroscopic methods nuclear radii and moments are determined on small samples of radioactive atoms. At the project study spallation neutrons source the institute participated by contributions to the user aspects in the field of neutron scattering and nuclear physics, by experiments on the main properties of the targets, as well as by developments of the beam diagnostics for the linear accelerator.

34793 **(KFTI—81-49) General and nuclear physics.** (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1981. 90p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780484.

Separate abstracts were prepared for items in scope for the Energy Data Base. (LTW)

34794 **Nuclear cross sections for technology.** Fowler, J.L.; Johnson, C.H.; Bowman, C.D. (eds.). Washington, DC; National Bureau of Standards (1980). 1056p. (CONF-791058—). NTIS, PC A99/MF A01 - GPO $21.00. Order Number DE83009849. Contract FG05-79ER10368.

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Portions are illegible in microfiche products.

Separate entries were made in the data base for 117 of the 205 papers presented. 78 papers were previously included in the data base. (WHK)

6511 Experimental Techniques

REFER ALSO TO CITATION(S) 34382, 34844, 34845

34795 **(LBL—10593) Time-domain multiple-quantum NMR.** Weitekamp, D.P. (Lawrence Berkeley Lab., CA (USA)). Nov 1982. Contract AC03-76SF00098. 268p. NTIS, PC A12/MF A01. Order Number DE83012439.

Portions are illegible in microfiche products; Thesis.

The development of time-domain multiple-quantum nuclear magnetic resonance is reviewed through mid 1982 and some prospects for future development are indicated. Particular attention is given to the problem of obtaining resolved, interpretable, many-quantum spectra for anisotropic magnetically isolated systems of coupled spins. New results are presented on a number of topics including the optimization of multiple-quantum-line intensities, analysis of noise in two-dimensional spectroscopy, and the use of order-selective excitation for cross polarization between nuclear-spin species.

34796 **Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei.** Muradyan, G.V. (I.V. Kurchatov Atomic Energy Inst., Moscow, USSR). *NBS Special Publication (United States);* No. 594, 521-523(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The present paper deals with the new method of neutron cross-section measurement and the investigation of ways of formation and decay of excited nuclei. The idea of the procedure from the view-point of measurement of partial neutron cross-sections has been described previously. It involves the measurement of total multiplicity sprectum of gamma-quanta and neutrons arising from reactions with neutrons. The object of the present article is the further generalization of the multiplicity spectrometry method and the broadening of the range of problems under investigation. At the same time a brief review of experiments on the multiplicity spectrometry is given.

6512 Nuclear Properties And Reactions, A=1-5

34797 **Threshold photoneutron angular distribution and polarization studies of nuclei.** Holt, R.J. (Argonne National Lab., IL). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* 28: No. 2, 1279-1285(Apr 1981).

The photoneutron method was applied to the study of (i) deuteron photodisintegration, (ii) giant magnetic dipole resonances in heavy nuclei, (iii) mechanism of radiative capture in light nuclei and (iv) isospin splitting of the giant dipole resonance in ^{60}Ni. These studies were performed with the pulsed bremsstrahlung beam and high-resolution spectrometer available at the Argonne high-current electron linac. A threshold photoneutron polarization method was developed in order to search for the giant M1 resonance in hevy nuclei. A surprisingly small amount of M1 strength was found in ^{208}Pb. Furthermore, the M1 strength for the 5.08-MeV excitation in ^{17}O, the best example of a single-particle M1 resonance in nuclei, was found to be strongly quenched. In addition, the ^{17}O(γ,n$_0$)^{16}O reaction was found to provide an ideal example of the Lane-Lynn theory of radiative capture. The interplay among the three components of the theory, internal, channel and potential capture, were evident from the data. An electron beam transport system was developed which allows the bremsstrahlung to impinge on the photoneutron target on an axis perpendicular to the usual reaction plane. This system provides an accurate method for the measurement of relative angular distributions in (γ,n) reactions. This system was applied to a high-accuracy measurement of the relative angular distribution for the D(γ,n)H reaction. The question of isospin-splitting of the giant dipole resonance in ^{60}Ni was studied by using the unique pico-pulse from the accelerator and the newly installed 25-m, neutron flight paths. The results provide clear evidence for the effect of isospin splitting.

34798 **Thermal neutron capture cross section in deuterium.** Alfimenkov, V.P.; Borzakov, S.B.; Wierzbicki, J.; Osipenko, B.P.; Pikelner, L.B.; Tishin, V.G.; Sharapov, E.I. (Joint Inst. for Nuclear Research, Dubna, USSR). *NBS Special Publication (United States);* No. 594, 394-396(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The radiative thermal nD capture cross section σ/sub D/ was measured by the time-of-flight method at the IBR-30 pulsed reactor using Ge(Li) detector, D_2O water sample and the σ/sub Cl/ thermal cross section as the standard. The result 487(24) μb is in favor of the theoretical value found in the frame of the three body problem.

6513 Nuclear Properties And Reactions, A=6-19

REFER ALSO TO CITATION(S) 34797

34799 **(DOE/ER/40048—32-L2) Proton capture to excited states of ^{16}O; MI, El and Gamow-Teller transitions and shell-model calculations.** Snover, K.A.; Adelberger, E.G.; Ikossi, P.G.; Brown, B.A. (Washington Univ., Seattle (USA). Nuclear Physics Lab.; Oxford Univ. (UK). Nuclear Physics Lab.; Michigan State Univ., East Lansing (USA). Cyclotron Lab.). 1982. Contract AC06-81ER40048. 77p. NTIS, PC A05/MF A01. Order Number DE83011480.

Portions are illegible in microfiche products.

We have measured excitation functions of the γ-rays resulting from the bombardment of ^{15}N by polarized and unpolarized protons in the energy range E/sub p/ = 2.5 to 9.5 MeV with emphasis on identifying dipole decays to the first (0^+) and second (3^-) excited states in ^{16}O. Resonances in γ_{12} are observed at E/sub x/ = 16.21, 16.45, 16.82, 17.12, 18.03, 18.98, 19.90 and 20.41 MeV. The 16.21 and 17.12 MeV resonances in γ_{12} are identified as M1-decays of the 1^+ T = 1 states to the 6.05 MeV 0^+ state in ^{16}O. The measured ratio of reduced strengths B(m1,γ_1)/(B(M1,γ_0) is 0.48 +- 0.03 for decays from the 16.21 MeV state and 0.55 +- 0.04 for decays from the 17.12 MeV state. The 18.03 MeV resonance is due to a 3^- T = 1 state in ^{16}O with a strength Gamma/sup p/Gamma/sub gamma 2//Gamma = (1.96 +- 0.27) eV and the 18.98 MeV resonance is due to the 4^- T = 1 stretched particle-hole state with a strength of (0.85 +- 0.10) eV. We determine absolute particle and γ widths for these states. The M1 γ_3-width of the 18.98 MeV state, (7.1 +- 3.1) eV, is in agreement with a shell-model calculation. Resonances in γ_3 are observed at 16.82 and 17.27 MeV and in γ_4 at 17.88 MeV. The excitation energies and widths of these levels as well as the strengths of the γ transitions suggest T = 1 character

for all of the resonances for which capture γ-rays are observed. Correspondences of our resonances to levels in ^{16}N are given. We compare γ widths, including ground-state M1 decays, and allowed β transition rate in A = 16 nuclei with shell model calculations and obtain rough agreement. Additional shell model calculations for M1 and GT (Gamow-Teller) decays in the A-14, 15, 17 and 18 nuclei are presented, which indicate that GT matrix elements are quenched by ~ 20% relative to shell model predictions and also relative to the spin part of the M1 matrix elements.

34800 **Nuclear cross sections for light ions on ^{6}Li.** Holland, R.E.; Elwyn, A.J.; Davids, C.N.; Meyer-Schuetzmeister, L.; Monahan, J.E.; Mooring, F.P.; Ray, W. Jr. (Argonne National Lab., IL). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* 28: No. 2, 1344-1349(Apr 1981).

We review our measurements of total and differential cross sections for protons, deuterons and ^{3}He incident on ^{6}Li. These are the reactions which are important for evaluating a fusion reactor based on burning ^{6}Li. Several of these reactions had not previously been measured, and among those that had there were large discrepancies in some cases. We employed several checks in our measurements to verify that the errors (including systematic errors) were 10 to 20 percent.

34801 **Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV.** Kellie, J.D. (Univ. of Glasgow, Scotland); Lamaze, G.P.; Schwartz, R.B. *NBS Special Publication (United States);* No. 594, 48-51(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

This paper describes the measurement of the total neutron cross sections of carbon, ^{6}Li and ^{7}Li from 3 to 40 MeV, using the pulsed beam of the national Bureau of Standards electron linear accelerator as a source of neutrons. The measured pulse width was approximately 5 ns FWHM and the neutron flight path was ~ 150 keV at the higher energies.

34802 **Measurement of the ^{10}B/^{6}Li cross section ratio below 1 keV.** Czirr, J.B.; Carlson, A.D. (National Bureau of Standards, Washington, DC). *NBS Special Publication (United States);* No. 594, 84-85(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The ratio of the ^{10}B(n,α) and ^{6}Li(n,α) standard cross sections has been measured from ~ 1 to 1000 eV with statistical uncertainties of < 1%. The measurements agree with ENDF/B-V above ~ 20 eV, however a significant difference is observed below ~ 20 eV. The present measurements do not explain the discrepancy between recent ^{235}U measurements at ORNL and LLL using ^{10}B(n,α) and ^{6}Li(n,α), respectively, as flux monitors.

34803 **Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV.** Adib, M.; Abdel-Kawy, A.; Maayouf, R.M.A.; Eid, Y.; Shuriet, G.; Hamouda, I. (Atomic Energy Establishment, Cairo, Egypt). *NBS Special Publication (United States);* No. 594, 101-104(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The total neutron cross-sections of Be, Ni, and Cu are measured using two time-of-flight spectrometers installed in front of two of the horizontal channels of the ET-RR-1 reactor. The measurements were carried out in the energy range from 2.2 eV to 2.2 meV at room temperature and at liquid nitrogen temperature for neutron energies below 5 meV. The coherent scattering cross-sections of these elements were determined from the Bragg cut-offs observed in the behavior of the total cross-sections at cold neutron energies. The incoherent cross-sections of Be, Ni and Cu were obtained from the analysis of the total neutron cross-section data beyond the Bragg cut-off. The one phonon annihilation process was estimated at long neutron wavelengths and was found to be in reasonable agreement with the results of calculations.

34804 **Utilization of the reaction ^{10}B(d,n) ^{11}C as a high temperature deuterium plasma diagnostic.** Len, L.K.; Cecil, F.E. (Colorado School of Mines, Golden). *NBS Special Publication (United States);* No. 594, 804-806(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

We have measured the thick target yield of the reaction ^{10}B(d,n) ^{11}C for monoenergetic deuteron beams of energies between 75 and 170 keV. These yields, together with recently published range energy relations for hydrogen ions in matter, permitted our deduction of the reaction cross section as a function of energy. By integrating the cross section over a Maxwell Boltzman population distribution, we obtained the reaction yields for boron samples exposed to a deuterium plasma of temperatures between 20 x 10^{6} and 200 x 10^{6} °K.

34805 **^{12}C + n polarization measurements and the carbon standard.** Weil, J.L.; Burrows, T.W.; McDaniel, F.D. (Univ. of Kentucky, Lexington). *NBS Special Publication (United States);* No. 594, 985-987(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The asymmetry of polarized neutrons scattered from carbon has been measured at several angles for neutron energies of 4.60, 4.82, and 5.17 MeV. From an analysis of the measured asymmetries together with previously measured total and differential cross sections, the scattering phase shifts of carbon have been determined with more precision and accuracy than previously available, making carbon more useful as a neutron scattering standard.

6514 Nuclear Properties And Reactions, A=20-38

34806 **(CONF-830469—2) Resonances in heavy systems.** Betts, R.R. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 22p. NTIS, PC A02/MF A01. Order Number DE83011721.

From Nuclear physics with heavy ions conference; Stony Brook, NY, USA (14 Apr 1983).

Portions are illegible in microfiche products.

The experimental situation for the study of resonances in heavy-ion collisions is reviewed, with emphasis on the heaviest systems. New data are presented which show some of the systematics of this phenomenon. The narrow resonance structures are established as a feature of the nuclear structure of the composite system rather than a purely entrance channel effect.

34807 **(KFK—3347) Capture cross sections of the neon isotopes and the s-process neutron balance.** Almeida, J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Zyklotronlaboratorium; Heidelberg Univ. (Germany, F.R.). Naturwissenschaftliche Gesamtfakultaet). May 1982. 70p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750111.

Thesis. Submitted to Heidelberg Univ., Germany, F.R.

The neutron capture cross sections of the three stable neon isotopes have been measured by the time-of-flight method in the energy range from 5 to 200 keV, using hydrogen free fast liquid scintillator detectors and the Maier-Leibnitz pulse height weighting technique. As a result it was found that neutron absorption by the light elements, from ^{20}Ne to ^{56}Fe, is dominated not by ^{22}Ne but by ^{25}Mg. The condition that as many neutrons should be produced as are absorbed has led to the conclusion that at least 80% of the ^{22}Ne must undergo the (α,n) reaction, which implies that less than 20% can undergo the (α,γ) reaction. Therefore the (α,n) reaction rate must be at least 4 times faster than the (α,γ) rate. An inspection of these reaction rates as a function of temperature shows that this condition can be satisfied only for T > 3.2 10^{8} K, or kT > 28 keV.

34808 (LBL—15874) Onset of incomplete momentum transfer in fusion-like processes. Stokstad, R.G.; Chan, Y.; Murphy, M.; Tserruya, I.; Wald, S.; Budzanowski, A. (Lawrence Berkeley Lab., CA (USA); Institute of Nuclear Physics, Krakow (Poland)). Mar 1983. Contract AC03-76SF00098. 34p. (CONF-830138—2). NTIS, PC A03/MF A01. Order Number DE83012476.

From Symposium on nuclear physics; Oaxtepec, Mexico (4 Jan 1983).

Velocity spectra of evaporation residues from the reactions ^{16}O + Al, Ca, and Ni have been measured at bombarding energies of 8.8, 13.6, and 19.6 MeV/u. Comparison with statistical model predictions shows clear evidence for the onset of incomplete momentum transfer at about 5 MeV/u above the interaction barrier. To first order, the results are similar for all targets, suggesting that the missing momentum is mainly associated with the projectile. The fraction of transferred linear momentum appears to decrease linearly with increasing relative velocity of the colliding nuclei at the barrier.

34809 Search for new isotopes at Brookhaven. Alburger, D.E. (Brookhaven National Lab., Upton, NY). *Transactions of the New York Academy of Sciences;* 40: 1-19(15 Sep 1980). Contract AC02-76CH00016.

A review of experiments leading to the discovery of the isotopes ^{33}Si, ^{35}P, ^{35}Ne, ^{31}Al, ^{39}Mg, and ^{25}F at the Brookhaven Tandem Van de Graaff accelerator is presented. Experimental techniques are described in some detail. The relationships of experimentally measured quantities to shell model predictions are discussed.

34810 Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb. Hino, Y.; Yamamoto, T.; Itagaki, S.; Sugiyama, K. (Tohoku Univ., Sendai, Japan). *NBS Special Publication (United States);* No. 594, 408-412(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Gamma-ray production cross sections have been measured for the (n,xγ) reactions in Al, Ni, Cu, and Nb at the neutron energies of 5.3, 5.9, 6.4 and 7.0 MeV. The Dynamitron accelerator and a deuterium gas target were used to produce pulsed monoenergetic neutrons. Gamma-rays were detected with a heavily shielded 70-cm^3 coaxial Ge(Li) detector placed at an angle of 125°. A time-of-flight technique was adopted to discriminate against pulses due to scattered neutrons and background radiations. Absolute cross sections of discrete gamma-ray lines are obtained. Total and unresolved gamma-ray production cross sections are also obtained by unfolding the pulse height spectra with a modified FERDOR code. The present results are discussed in comparison with previous data, and are in general agreement with those of ORNL.

6515 Nuclear Properties And Reactions, A=39-58

REFER ALSO TO CITATION(S) 34803, 34808, 34810

34811 (KFK—3412) Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV. Kaeppeler, F.; Wisshak, K.; Hong, L.D. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik 2). Nov 1982. 44p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750392.

The neutron capture cross section of ^{56}Fe and ^{58}Fe has been measured in the energy range from 10 to 250 keV relative to the gold standard. A pulsed 3 MV Van de Graaff accelerator and the $^7Li(p, n)$ reaction served as a neutron source. Capture gamma rays were detected by two C_6D_6 detectors, which were operated in coincidence and anticoincidence mode. Two-dimensional data acquisition allowed to apply the pulse height weighting technique off-line. The samples were located at a flight path of 60 cm. The total time resolution was 1.2 ns thus allowing for an energy resolution of 2 ns/m. The experimental set-up was optimized with respect to low background and low neutron sensitivity. The additional flight path of 4 cm from the sample to the detector was sufficient to discriminate capture of sample scattered neutrons by the additional time-of-flight. In this way reliable results were obtained even for the strong s-wave resonances of both isotopes. The experimental capture yield was analyzed with the FANAC code. The energy resolution allowed to extract resonance parameters in the energy range from 10 to 100 keV. The individual systematic uncertainties of the experimental method are discussed in detail. They were found to range between 5 and 10% while the statistical uncertainty is 3-5% for most of the resonances. A comparison to the results of other authors exhibits in case of ^{56}Fe systematic differences of 7-11%. For ^{58}Fe the present results differ up to 50% from the only other measurement for this isotope.

34812 Neutron scattering cross sections from (n,n') and (n,n'γ) methods: a comparison. McDaniels, F.D.; Glasgow, G.P.; McEllistrem, M.T. (Univ. of Kentucky, Lexington). *NBS Special Publication (United States);* No. 594, 135-138(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Neutron inelastic scattering cross sections can be obtained conveniently from (n,n'γ) yields provided a good normalization standard is available. Measurements from independent neutron and γ-ray detection experiments are compared to confirm the use of the $^{56}Fe(n,n'\gamma)$ ^{56}Fe - 846.7-keV production cross section as a normalization standard.

34813 Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni. Yamanouti, Y.; Rapaport, J.; Grimes, S.M.; Kulkarni, V.; Finlay, R.W.; Bainum, D.; Grabmayr, P.; Randers-Pehrson, G. (Ohio Univ., Athens). *NBS Special Publication (United States);* No. 594, 146-149(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Differential cross sections for the scattering of 24 MeV neutrons from $^{58,60}Ni$ were measured as part of a continuing study of nucleon scattering from single-closed-shell nuclei. Measurements were taken every 5° from 15° to 150° using the Ohio University time-of-flight spectrometer. Inelastic excitation of the first 2^+ and 3^- states was measured simultaneously with the elastic scattering in each case. Results are analyzed in terms of a global nucleon-nucleus optical model potential, DWBA and coupled-channel calculations using collective model.

34814 Determination of the capture width of the 27.7 keV s-wave resonance in ^{56}Fe. Wisshak, K.; Kaeppeler, F. (Kernforschungszentrum Karlsruhe GmbH, Germany). *NBS Special Publication (United States);* No. 594, 155-158(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The capture width of the 27.7 keV s-wave resonance in ^{56}Fe has been determined using a setup completely different from previous experiments. A pulsed 3 MV Van de Graaff accelerator and the $^7Li(p,n)$ reaction served as a neutron source. Capture gamma rays were observed by a Moxon-Rae detector and gold was used as a standard. The samples were positioned at a flight path of only 7.6 - 8.0 cm. This allowed the use of very thin samples avoiding large multiple scattering corrections. Three metallic discs enriched in ^{56}Fe were used with a thickness between 0.6 and 0.15 mm. Capture events in the detector due to resonance scattered neutrons were discriminated by time-of-flight. The result for the capture width is $\Gamma/$ sub $\gamma/ = 0.99$ with a statistical uncertainty of 1.3% and a systematic uncertainty of ~ 5%.

34815 Neutron capture cross section measurements of ^{56}Fe. Brusegan, A.; Corvi, F.; Rohr, G.; Shelley, R.; van der Veen, T. (Central Bureau for Nuclear Measurements, Geel, Belgium). *NBS Special Publication (United States);* No. 594, 163-167(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

High resolution capture cross section measurements have been carried out on an enriched sample of ^{56}Fe at the Geel linear electron accelerator. The data have been analysed up to 100 keV and the deduced capture areas and relevant resonance parameters

are given. Special emphasis has been given to problems connected with the weighting method and the capture data normalization.

34816 Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons. Woo, T.W.; Salaita, G.N. (Southern Methodist University, Dallas, TX). *NBS Special Publication (United States);* No. 594, 853-856(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The cross sections for (n,t) reaction of 14.6 MeV neutrons with isotopes of the natural elements calcium, iron, yittrium, palladium, tin, lanthanum, and lead, and with enriched isotopes stronium-86, cadmium-114, tellurium-130, and thallium-205 were measured by the activation technique using high-energy resolution gamma-ray spectrometry. The experimental results are generally in good agreement with cross sections values obtained from an empirical equation and with recently reported measurements. The cross section ratio of (n,t) and (n,p) were calculated on the basis of the statistical model.

34817 Total neutron cross section of ^{45}Sc at the 2 keV. Razbudey, V.F.; Muravitsky, A.V.; Vertebnyi, V.P.; Kiriluk, A.L. (Inst. for Nuclear Research, Kiev, USSR). *NBS Special Publication (United States);* No. 594, 890-892(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The scandium neutron cross section at 2 keV interference minimum σ/sub min/ is equal to 0.27 +- 0.07 barn from measurements at the WWR-M reactor. This figure is much lower than the value of 0.71 +- 0.03 barn recently reported by other authors. Transmissions of T of a high purity metallic scandium 22.5-cm-thickness sample were measured with scandium filters of variable thickness (from 63 to 173 cm). The simple formula suited for experiments like the present one was deduced for σ/sub min/.

34818 Cross section for the ^{56}Fe(n,p) reaction for 14.73 MeV neutrons. Ryves, T.B.; Axton, E.J. (National Physical Laboratory, Teddington, Middlesex, England). *NBS Special Publication (United States);* No. 594, 980-984(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

A value for the cross section for the ^{56}Fe(n,p)^{56}Mn reaction for 14.73 MeV neutrons has been derived from a critical evaluation of measurements performed as part of an international comparison of fast neutron flux density organized by the Bureau International des Poids et Mesures between 1974 and 1978.

6516 Nuclear Properties And Reactions, A=59-89

REFER ALSO TO CITATION(S) 34797, 34803, 34808, 34810, 34813, 34816

34819 (CONF-830469—1) Measurement of the half-life of ^{60}Fe using the Argonne FN tandem-superconducting Linac system as an accelerator mass spectrometer. Kutschera, W.; Billquist, P.J.; Frekers, D. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 2p. NTIS, PC A02/MF A01. Order Number DE83011710.

From Nuclear physics with heavy ions conference; Stony Brook, NY, USA (14 Apr 1983).

An experiment to improve the accuracy in the half-life value of ^{60}Fe by measuring both the amount of ^{60}Fe nuclei and the decay-rate of a spallation produced sample using the relation dN/dt = -λ N is briefly discussed. (WHK)

34820 Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV. Ohkubo, M.; Kawarasaki, Y.; Mizumoto, M. (Japan Atomic Energy Research Inst., Tokai, Ibaraki). *NBS Special Publication (United States);* No. 594, 173-176(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Resonance parameters of separated isotopes of bromine were measured using TOF spectrometer of Japan Atomic Energy Research Institute linear accelerator. Transmission and capture measurements were made with ^{6}Li-glass and Moxon-Rae detectors, on separated isotopes (~ 98%) of ^{79}Br and ^{81}Br. Resonance analyses were made on transmission data with an area analysis code, and on capture data with a Monte-Carlo program CAFIT. For ^{79}Br gΓ^{o}/sub n/ values for 156 levels below 10 keV are obtained, and for ^{81}Br 100 levels below 15 keV. Strength functions are obtained: for ^{79}Br S/sub O/ = (1.27 +- 0.14) x10^{-4} below 10 keV, and for ^{81}Br S/sub O/ = (0.86 +- 0.14)10^{-4} below 15 keV. Intermediate structures are observed in the resonances of ^{81}Br showing clusters of levels at 1.2, 10, 11.5, and 14 keV, where the sum of gΓ^{o}/sub n/ vs. neutron energy shows steep rises.

34821 KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system. Leugers, B. (Kernforschungszentrum Karlsruhe GmbH, Germany); Kaeppeler, F.; Fabbri, F.; Reffo, G. *NBS Special Publication (United States);* No. 594, 857-861(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The neutron capture cross sections of natural Kr, ^{84}Kr and three samples enriched in ^{82}Kr, ^{83}Kr, and ^{86}Kr were measured with the time-of-flight technique in the energy range between 3 and 250 keV. The energy resolution was 1.5 ns/m. Capture gamma rays were detected by two C_6D_6 detectors using the pulse height weighting technique off-line. From these data, Maxwellian averaged cross sections $< \sigma v >$/v/sub T/ have been determined for all stable Kr isotopes with an accuracy of typically 10 %, except for ^{78}Kr and ^{86}Kr, where the uncertainties are 30 % and 100 %, respectively. In addition, the cross sections for all s-process isotopes of Se, Br, and Kr were calculated with a Hauser Feshbach formalism with width fluctuation corrections, using carefully evaluated level densities and radiative decay widths. In the calculations all available experimental information about these cross sections was considered to include the local behavior of parameters. With this improved set of cross sections, the solar system abundance of Kr was determined from s-process systematics.

6517 Nuclear Properties And Reactions, A=90-149

REFER ALSO TO CITATION(S) 34380, 34796, 34806, 34810, 34816, 34831, 34849, 34850, 34858

34822 (DOE/ER/40048—33-L2) Half-life of ^{138}La. Norman, E.B.; Nelson, M.A. (Washington Univ., Seattle (USA). Nuclear Physics Lab.). 1982. Contract AC06-81ER40048. 2p. NTIS, PC A02/MF A01. Order Number DE83011483.

Tanaka and Masuda recently have observed ^{138}Ce/^{142}Ce isotopic abundance ratios which vary linearly with the ^{138}La/^{142}Ce abundance ratios in samples of ancient rocks. These variations have been interpreted to be the result of in situ decay of ^{138}La and thus suggest the potential usefulness of the ^{138}La/^{138}Ce geochronometer. However, in order to reconcile the age of the samples inferred from the ^{138}La/^{138}Ce clock with that obtained from the well-established ^{147}Sm/^{143}Nd chronometer, these authors had to use a value of the ^{138}La half-life approximately 16% less than the mean of the published values for this quantity. to justify the use of this shorter half-life, Tanaka and Masuda argued that the absorption of atmospheric H_2O and CO_2 by La_2O_3 probably led to overestimates of the amounts of La contained in samples used in ^{138}La half-life determinations. Recently, however, we have reinvestigated the half-life and decay scheme of ^{138}La using 99.999% pure La_2O_3 samples. Results are reported. (WHK)

34823 (LBL—15875) Beta-decay measurements of neutron-deficient cesium isotopes. Parry, R.F. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 121p. NTIS, PC A06/MF A01. Order Number DE83012438.

Portions are illegible in microfiche products; Thesis.

Beta decay endpoint energy measurements of the neutron deficient cesium isotopes were done using an energy spectrum shape fitting technique. This was a departure from the typical method of endpoint energy analysis, the Fermi-Kurie plot. A discussion of the shape fitting procedure and its improved features are discussed. These beta endpoint measurements have led to total decay energies (Q/sub EC/) of the neutron deficient $^{119-123}$Cs isotopes. The total decay energies of /sup 122m/Cs (Q/sub EC/ = 6.95 +- 0.25 MeV) and ^{119}Cs (Q/sub EC/ = 6.26 +- 0.29 MeV) were new measurements. The total decay energies of ^{123}Cs (Q/sub EC/ = 4.05 +- 0.18 MeV), /sup 122g/Cs (Q/sub EC/ = 7.05 +- 0.18 MeV), ^{121}Cs (Q/sub EC/ = 5.21 +- 0.22 MeV), and ^{120}Cs (Q/sub EC/ = 7.38 +- 0.23 MeV) were measurements with significantly improved uncertainties as compared to the literature. Further, a combination of the energy levels derived from previous literature gamma-gamma coincident measurements and the experimental beta-coincident gamma decay energies has supported an improved level scheme for ^{121}Xe and the proposal of three new energy levels in ^{119}Xe. Comparison of the experimental cesium mass excesses (determined with our Q/sub EC/ values and known xenon mass excesses) with both the literature and theoretical predicted values showed general agreement except for ^{120}Cs. Possible explanations for this deviation are discussed.

34824 (UCRL—89024) Applied uses of nuclear level densities. Haight, R.C. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 19p. (CONF-830465—2). NTIS, PC A02/MF A01. Order Number DE83012103.

From IAEA meeting on basic and applied problems of nuclear level densities; Upton, NY, USA (11 Apr 1983).

Portions are illegible in microfiche products.

General and specific applications on nuclear level densities are described. Areas of particular applied interest are fission reactors, fusion reactors, and astrophysics.

34825 Unique parity states in ^{109}Pd as a test of particle-rotor and IBFA models. Casten, R.F. (Brookhaven National Lab., Upton, NY). pp 317-320 of Interacting bose-fermi systems in nuclei. Iachello, F. New York, NY; Plenum Publishing Corporation (1981). Contract AC02-76CH00016.

(n,γ) techniques were used to study, for the first time, an essentially complete set of low spin, anti-aligned, unique parity levels in ^{109}Pd. The particle rotor model, notably successful[4] for high spin states of the same h/sub 11/2/ parentage in this mass region, did not, and could not, explain the empirical energy levels, even when core asymmetry was included. IBFA calculations involving only two parameters accounted well for both the high spin levels in ^{108}Pd and the low spin states of ^{109}Pd. Analysis of the resulting IBFA wave functions showed large probabilities for core states other than those of the quasi ground band, in particular those associated with the quasi-β band.

34826 Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique. Beer, H.; Kaeppeler, F. (Kernforschungszentrum Karlsruhe GmbH, Germany). *NBS Special Publication (United States);* No. 594, 348-350(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The capture cross section of ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu, and the capture cross section of ^{175}Lu to the 3.68 h isomeric state in ^{176}Lu have been determined at 30 keV neutron energy using the activation technique. Neutrons were generated via the ^{7}Li(p,n) reaction just above the reaction threshold at a 3 MV pulsed Van de Graaff accelerator. The neutron beam was kinematically collimated with an energy spectrum similar to a Maxwellian distribution, so that the activation measurements yielded directly Maxwellian averaged capture cross sections.

34827 Gamma-ray production cross sections for MeV neutrons. Kitazawa, H. (Tokyo Inst. of Tech., Japan); Harima, Y.; Yamakoshi, H.; Sano, Y.; Kobayashi, T.; Kawai, M. *NBS Special Publication (United States);* No. 594, 775-777(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Gamma-ray production cross sections for MeV neutrons are calculated for several nuclei over the wide nuclear mass number from 27 to 208. The results are compared with experimental data. It is found that the model and assumptions adopted in the present calculation are adequate for description of the gross dependence of gamma-ray production cross section on neutron energy and nuclear mass number, unless the radiative neutron capture process is dominant in comparison with other possible ones.

34828 Semiempirical calculation of excitation functions. Petersen, E.L. (Naval Research Lab., Washington, DC). *NBS Special Publication (United States);* No. 594, 778-782(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

A simple model for the calculation of excitation functions is described. The geometrical cross section, allowing for transparency, is divided into statistical, direct and preequilibrium portions. These cross sections are allocated to individual reactions by examining the relative contributions of all possible reactions emitting the same number of particles. The cross section for each reaction product is then calculated as a function of energy. A computer code has been written that calculates excitation functions in the range between 5 and 80 MeV for reactions emitting from one to six particles. The results are compared with experimental values for proton reactions with ^{27}Al, ^{58}Ni, ^{59}Co, and ^{209}Bi.

34829 Measurement of the total Nd-145 neutron cross section. Anufriev, V.A.; Kolesov, A.G.; Babich, S.I.; Safonov, V.A. (Research Inst. of Atomic Reactors, Dimitrovgrad, USSR). *NBS Special Publication (United States);* No. 594, 877(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Measurements of the total cross section of neodymium 145 in the energy range from 0.02 to 350 eV by the time-of-flight method at the SM-2 reactor neutron spectrometer are briefly described. (WHK)

34830 Resonance parameters of Nd-147 (T/sub 1/2/ = 11ds) isotope neutron levels. Anufriev, V.A. (Research Inst. of Atomic Reactors, Dimitrovgrad, USSR); Babich, S.I.; Nefedov, V.N.; Poruchikov, V.A.; Artomonov, V.S.; Ivanov, R.N.; Kalebin, S.M. *NBS Special Publication (United States);* No. 594, 907(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The results are presented on the measurements of Nd-147 (T/sub 1/2/ = 11 ds) radioactive nucleus neutron resonances. The measurements were performed by the time-of-flight method at the SM-2 reactor neutron spectrometer.

6518 Nuclear Properties And Reactions, A=150-189

REFER ALSO TO CITATION(S) 34826

34831 (BNL—32902) Transition from collective to non-collective rotation at high spin in N ≃ 87 nuclei. Baktash, C. (Brookhaven National Lab., Upton, NY (USA); Oak Ridge National Lab., TN (USA)). 1982. Contract AC02-76CH00016. 20p. (CONF-821143—7). NTIS, PC A02/MF A01. Order Number DE83011640.

From High angular momentum properties of nuclei conference; Oak Ridge, TN, USA (2 Nov 1982).

Portions are illegible in microfiche products.

The systematics of the (E2) γ ray transition energies and the available lifetime data are used to characterize the excitation modes of the light rare-earth nuclei (N ≧ 82) at different spins. The results, which include our recently obtained data on ^{149}Gd, ^{154}Ho, ^{155}Er, ^{157}Yb and ^{159}Yb nuclei, indicate that, at low spins, the nuclear excitation mode (shapes) change from single-particle excitations (weakly oblate) in N ≦ 85 nuclei to quasi-vibrational (soft triaxial) in N = 86, weakly rotational (prolate) in N = 87, and rotational

(prolate) in the N ≧ 88 systems. At higher angular momenta, all these nuclei show a general tendency to traverse the (epsilon,γ) plane towards the oblate axis, and to eventually adopt the aligned coupling mode of excitation.

34832 Conversion electron Moessbauer spectroscopy of europium-151 and thulium-169. Shenoy, G.K.; Niarchos, D.; Viccaro, P.J.; Dunlap, B.D. (Argonne National Lab., IL). *Advancement of Science;* No. 194, 117-123(1981).

We demonstrate the feasibility of conversion electron Moessbauer specroscopy of rare-earth systems using the 21.53-keV transition in ^{151}Eu and the 8.4-keV transition in ^{169}Tm. The resonance spectra of ^{151}Eu are measured using L conversion electrons with kinetic energy of about 13.5 keV. For ^{169}Tm the conversion process involves M electrons that have kinetic energy of approximately 6.1 keV. The comparison of the conversion electron spectra to transmission data for a number of europium-based compounds indicates that an enhancement of the resonant effect occurs in most cases using the conversion electron technique. For ^{169}Tm, a dilution of the effect occurs from photoelectrons of thulium.

34833 Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer. Beer, H.; Wisshak, K.; Kaeppeler, F. (Kernforschungszentrum Karlsruhe GmbH, Germany). *NBS Special Publication (United States);* No. 594, 340-343(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu and ^{184}W have been measured in the keV neutron energy range with a pulsed Van de Graaff accelerator using the kinematically collimated neutron beam from the ^{7}Li(p,n) and the T(p,n) reaction. Prompt capture gamma rays were registered by a Moxon-Rae detector. All measurements were performed in a single run relative to the ^{197}Au cross section as a standard. The cross sections of ^{175}Lu and ^{170}Yb were used to investigate the ^{176}Lu-cosmic clock.

6519 Nuclear Properties And Reactions, A=190-219

REFER ALSO TO CITATION(S) 34797, 34816, 34835

34834 (DOE/ER/40048—38-L2) Elastic and inelastic scattering of polarized protons from ^{208}Pb near isobaric analog resonances. Back, N.L.; Cramer, J.G. (Washington Univ., Seattle (USA). Nuclear Physics Lab.). 1982. Contract AC06-81ER40048. 67p. NTIS, PC A04/MF A01. Order Number DE83011485.

Excitation functions have been measured for the elastic and inelastic scattering of polarized proton from ^{208}Pb at theta/sub lab/ = 120°, 135°, 150°, and 165° in the energy range E/sub p/ = 14.25 to 18.00 MeV. Excellent fits to the elastic scattering data were obtained using a parametrized background and the isobaric analog resonances (IAR's) of 35 states in ^{209}Pb (the parent states) with E/sub x/ = 2.3 to 5.7 MeV; spin-parity assignments and resonance parameters were determined for all of these IAR's. The data for inelastic scattering to the first excited state (2^+, 0.803 MeV) were described using a DWBA background and the same IAR's; good fits to the data were obtained by varying only the inelastic partial width amplitudes. A set of spectroscopic amplitudes was then found, for both the single-particle and the particle-core components of the parent states, by comparing the best-fit resonance parameters with those given by model calculations. The internal consistency of this set was verified by using sum rules. The spectroscopic amplitudes are compared with those given by simple weak-coupling model predictions; there is considerable disagreement, probably because too few configurations were used in the theoretical calculations.

6520 Nuclear Properties And Reactions, A=220 And Above

REFER ALSO TO CITATION(S) 34383, 34796, 34796

34835 (CONF-830469—3) Quasi-fission. Back, B.B. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83011717.

From Nuclear physics with heavy ions conference; Stony Brook, NY, USA (14 Apr 1983).

Recent experimental and theoretical investigations have led to the characterization of a new reaction mechanism called quasi-fission. This process is characterized by the emergence of fission-like fragments, which do not originate from the fission decay of a compound nucleus formed by heavy-ion fusion, but rather from the break up of a short-lived intermediate complex. The occurrence of quasi-fission processes appear to be limited to heavy reaction systems and/or large angular momenta, although the present work demonstrates that such reactions occur for somewhat lighter projectiles than previously believed. It is thus shown that measurements of fragment angular distributions provide a signature for quasifission by being sensitive to whether or not a compound nucleus was formed during the reaction. From an analysis of such data it is concluded that the possibilities for synthesizing super-heavy elements in the range Z=112-116 are reduced considerably over previous estimates.

34836 Perturbations of nuclear cross sections associated with changes in molecular vibrational energy. Bowman, C.D.; Schrack, R.A. (National Bureau of Standards, Washington, DC). *NBS Special Publication (United States);* No. 594, 93-96(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The change in molecular vibration energy upon absorption of a neutron by a nucleus bound in a free molecule can influence resonance shape and other aspects of neutron reaction cross section. A formalism is developed for centrosymmetric molecules such as UF_6 which allows a calculation of the displacement in resonance energy and the dispersion in resonance shape arising from molecular transitions. The calculations have been applied to the 6.67 ev resonance in ^{238}U. Comparison with measurements of $^{238}U_3O_8$ and $^{238}UF_6$ indicate satisfactory agreement.

34837 Measurement of U-235 absolute alpha value in the neutron energy range from 0.1 to 30 keV. Muradyan, G.V.; Schepkin, Yu.G.; Adamchuk, Yu.V.; Voskanyan, M.A. (I.V. Kurchatov Atomic Energy Inst., Moscow, USSR). *NBS Special Publication (United States);* No. 594, 488-490(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

In order to measure the neutron-physical constants with high accuracy and to investigate ways of formation and decay of excited nuclei a method has been developed at the I.V. Kurchatov AEI, based on the gamma-quanta and neutrons multiplicity spectrometry. During 1974-1978 there have been constructed a number of multisectional 4π-detectors which have demonstrated great possibilities for this method. A detector permitting the required accuracy of measurements of neutron cross sections and their ratios has been chosen and designed on the basis of these works. The detector with 4π-geometry has 46 sections and was based on naI(Tl) crystals with the total volume of the scintillator of ~ 100 l. The detector was used at the 26-m station. The results of U-235 absolute alpha value measurements are presented. The measurements are carried out over the energy range from 0.1 to 30 keV with the high accuracy - better than 5%. The equipment parameters and measurement conditions are listed. (WHK)

34838 First and second chance fission calculations for actinides and related topics. Maino, G.; Menapace, E.; Motta, M.; Ventura, A. (Centro di Calcolo del CNEN, Bologna, Italy). *NBS Special Publication (United States);* No. 594, 500-503(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

First and second chance contributions to neutron induced fission cross sections in an energy range of interest for reactor applications (E/sub n/≦ 13 MeV) were obtained by extensive and consistent calculations for ^{241}Am; moreover, a simplified semiempirical approach was applied to ^{235}U and ^{239}Pu.

34839 Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region. Bakalov, T. (Joint Inst. for Nuclear Research, Dubna, USSR); Ilchev, G.; Toshkov, S.; Mai, T.K.; Janeva, N.; Van'kov, A.A.; Grigoriev, Yu.V.; Ukraintsev, V.F. *NBS Special Publication (United States);* No. 594, 692-697(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The transmission and self-indication measurements with U-235 and Pu-239 have been carried out using the ^{3}He proportional counter and fission chambers in the 2 eV-20 keV energy region. The TOF technique was used with JINR pulse fast reactor IBR-30 in Dubna as a neutron source, the resolution being 100 nsec/m (^{3}He counter measurements) and 53 nsec/m (fission chamber measurements). The sample thickness was varied from 0.0013 atom/barns to 0.172 atom/barns. Average total cross sections with self shielding factors and self-shielding fission factors were determined for energies within ABBN nuclear constant set.

34840 Simultaneous evaluation of the nuclear data for heavy nuclides. Matsunobu, H. (Sumitomo Atomic Energy Industries, Ltd., Tokyo, Japan); Kanda, Y.; Kawai, M.; Murata, T.; Kikuchi, Y. *NBS Special Publication (United States);* No. 594, 715-719(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The nuclear data of ^{235}U, ^{238}U, ^{239}Pu, and ^{241}Pu were simultaneously evaluated in the energy range of 100 eV to 20 MeV by using recent experimental data and theoretical calculations for Japanese Evaluated Nuclear Data Library-Version 2 (JENDL-2). The optical potential parameters were so searched for that the total cross sections of these heavy nuclides were well reproduced with simple systematics.

34841 Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region. Babich, S.I. (Research Inst. of Atomic Reactors, Dimitrovgrad, USSR); Kocherygin, N.G.; Kolesov, A.G.; Poruchikov, V.A.; Safonov, V.A.; Nefedov, V.N.; Artomonov, V.S.; Belanova, T.S.; Ivanov, R.N.; Kalebin, S.M. *NBS Special Publication (United States);* No. 594, 908(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Neutron resonance parameters as tabulated for curium-242 and 244 through 248. (WHK)

34842 ^{235}U (n,f) cross section measurements and normalization problems. Wagemans, C.; Coddens, G.; Deruytter, A.J. (Nuclear Physics Lab., Gent, Belgium). *NBS Special Publication (United States);* No. 594, 961-965(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

At Gelina measurements of the ^{235}U fission cross section were performed relative to ^{10}B(n,α) ^{7}Li and ^{6}Li(n,α)^{3}H independently. The neutron energy range from thermal up to 30 keV was covered, allowing a normalization to the 2200 m/s reference cross section. Surface barrier detectors and back-to-back foils were used. Thus the fission fragments and the neutron flux are measured at the same time and from the same position in the neutron beam. Special attention is given to problems such as background determination, overlap filters, normalization and secondary standards (resonance integrals). Especially the present status of the resonance integrals (7.8 to 11 eV and 0.1 to 1 keV) often used for normalization purposes, is reviewed. Finally, an intercomparison of the present average/sub f/-values as well as comparison with other recent results is made.

34843 Absolute measurement of the U-235 fission cross section from 0.2 - 1.2 MeV. Meier, M.M.; Wasson, O.A.; Duvall, K.C. (National Bureau of Standards, Washington, DC). *NBS Special Publication (United States);* No. 594, 966-970(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The absolute U-235 neutron induced fission cross section has been measured at the NBS 3MV Van de Graaff laboratory from 0.2 to 1.2 MeV. The neutron flux monitor was a large plastic scintillator whose efficiency was both calculated and measured with the associated particle technique. The neutron source was the ^{7}Li(p,n)^{7}Be reaction. Pulsed-beam time-of-flight techniques were used. The fission detector consisted of a large volume multiplated chamber with a measured mass of ^{235}U. The cross sections, which were measured with a typical one standard deviation of 2.8%, are approximately 3% lower than the ENDF/B-V evaluation.

34844 Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides. Arlt, R. (Technical Univ. of Dresden, Germany); Grimm, W.; Josch, M. *NBS Special Publication (United States);* No. 594, 990-994(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The joint fission cross-section measurements program of the V. G. Khlopin Radium Institute and the Technical University of Dresden is described. The errors and uncertainties of the time correlated associated particle method of fission cross-section measurements for 2.6, 8.5, and 14.7-MeV neutrons are discussed. Experimental results of absolute fission cross-section measurements of ^{236}U, ^{238}U, ^{237}Np, and ^{239}Pu for 14.7 MeV-neutrons and of ^{235}U for 2.6 and 8.2-MeV neutrons are given.

34845 Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons. Adamov, V.M. (V.G. Khlopin Radium Inst., Leningrad, USSR); Alkhazov, I.D.; Gusev, S.E. *NBS Special Publication (United States);* No. 594, 995-999(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

An application of the time correlated associated particle method to absolute induced fission cross-section measurements for ^{252}Cf fission spectrum neutrons and 14.7-MeV neutrons is described. The errors and uncertainties of the proposed modification of the TCAPM are given. New results of absolute cross-section measurements of ^{234}U and ^{236}U for both ^{252}Cf fission spectrum neutrons and 14.7-MeV neutrons as well as of ^{235}U for 14 to 15-MeV neutrons are presented. The experimental results of cross-section measurements of ^{233}U, ^{238}U, ^{237}Np, ^{239}Pu, and ^{242}Pu obtained earlier have been revised on the basis of more realistic calculations of neutron scattering.

6530 Nuclear Theory

REFER ALSO TO CITATION(S) 33718, 34764, 34825, 34828, 34835

34846 (CONF-830465—1) Pairing correction for particle-hole state densities. Fu, C.Y. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 6p. NTIS, PC A02/MF A01. Order Number DE83012063.

From IAEA meeting on basic and applied problems of nuclear level densities; Upton, NY, USA (11 Apr 1983).

The pairing correction proposed by Ignatyuk and Sokolov for particle-hole state densities has been examined. It has been found that the accuracy of the correction is sufficient for practical applications only if the system is in its normal state ($\Delta = 0$). In the superfluid state (Δ not equal to 0), a consistent pairing-Pauli correction is developed here for improved accuracy. Practical implementations of the pairing correction are given and further developments are outlined.

34847 Classifying the singularity in the deformation shape of the liquid-drop model. Alesso, H.P.; Smith, C.F. (Lawrence Livermore Lab., CA). *Nuovo Cimento [Sezione] A;* **66A**: No. 3, 272-282(1 Dec 1981).

The deformation shape of the liquid-drop model of nuclear fission can be excellently represented by the Legendre-polynomial expansion method. Unfortunately, in the past, it has appeared necessary to include a large number of higher-order terms in order to describe the more deformed shapes encountered in the late stages of fission. In this paper, we classify the degenerate singularity that occurs in the Businaro-Gallone-Swiatecki representation of the Legendre-polynomial expansion of the deformation shape for the slightly distorted ground state. In our analysis, we found the singularity to be double-degenerate and strongly 3-determinate. As a result, we have classified it as a hyperbolic-umbilic elementary catastrophe. In order to make the potential function of the singularity a universal unfolding, we introduced two new control parameters for the liquid-drop model.

34848 Relationship between the Bohr collective model and the interacting boson model. Ginocchio, J.N. (Los Alamos Scientific Lab., NM). pp 179-191 of Interacting bose-fermi systems in nuclei. Iachello, F. (ed.). New York, NY; Plenum Publishing Corporation (1981).

The Bohr-Mottelson collective model has been very successful in describing the quadrupole collective degrees of freedom of heavy nuclei. As we have seen from this workshop, the interacting boson model (IBM) has also been successful in describing similar data. At first glance these models seem very different. The former treats the nucleus as a rotating and vibrating liquid drop with quadrupole degrees of freedom. The latter describes the low-lying collective states of heavy nuclei by assuming that only the collective J = 0 (monopole) and J = 2 (quadrupole) pairs of valence fermions outside of closed shells play the dominant role in these states. The purpose of this talk is to make a connection between these two models. The important concept in making that connection is that of the intrinsic state for the IBM. Before discussing the intrinsic state, we give a short review of the Bohr-Mottelson model.

34849 Improved formulas for compound nucleus cross sections. Tepel, J.W. (Kernforschungszentrum Karlsruhe, Germany); Hofmann, H.M.; Herman, M. *NBS Special Publication (United States);* No. 594, 762-764(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

In an extension of previous work on the theory of statistical cross sections model calculations have been performed in the region of weak absorption, which is of particular interest in applied work involving neutron capture or neutron scattering at low energies. Improved formulas for calculating compound nucleus cross sections and width fluctuation correction factors are presented. Although we agree with Moldauer that the factorization condition for cross sections is not always satisfied in few channel cases where strongly and weakly absorbing channels are mixed, the formulas provide a good description of the computer-generated cross sections. In addition, the structure of the improved formula has been chosen as to describe cases where many weakly absorbing channels contribute.

34850 Simple parameterization for optical reaction cross sections. Narasimha Murthy, K.H.; Chatterjee, A.; Gupta, S.K. (Bhabha Atomic Research Center, Bombay, India). *NBS Special Publication (United States);* No. 594, 793-795(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Optical model reaction cross sections for neutrons, protons and alpha particles, are directly parametrized using simple expressions reflecting the mass number and energy dependence. The cross sections can be calculated within an accuracy of 5 to 10% over the whole periodic table and the energy range up to 50 MeV. These cross sections are useful inputs for calculating various partial reaction cross sections using statistical models of nuclear reactions.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 33710, 33723, 33732, 34716, 34751, 34803, 34817

34851 (BONN-HE—82-6) Accuracy of track reconstruction with inhomogeneous magnetic detectors. Mecking, B. (Bonn Univ. (Germany, F.R.). Physikalisches Inst.). Mar 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750056.

An analytical method is described to determine the effects of position resolution and multiple scattering in discrete or continuous materials on the accuracy of the track reconstruction in detectors using an inhomogeneous magnetic field.

34852 (DP-MS—83-2) EXTREME: a new two-dimensional Cartesian-geometry discrete-ordinates method. Pevey, R.E.; Dodds, H.L. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.; Tennessee Univ., Knoxville (USA). Dept. of Nuclear Engineering). 1983. Contract AC09-76SR00001. 8p. (CONF-830304—21). NTIS, PC A02/MF A01. Order Number DE83011634.

From American Nuclear Society topical conference on computational methods; Salt Lake City, UT, USA (28 Mar 1983).

The purpose of this work is the development and testing of EXTREME, a new method for calculating the spatial dependence of the neutron density in nuclear systems described in two-dimensional Cartesian geometry. The energy dependence of the neutron density is approximated using the multipgroup treatment; the angular dependence uses the discrete ordinates technique. The resulting FORTRAN computer code is designed to handle an arbitrary number of spatial, energy, and angle subdivisions. Any degree of scattering anisotropy can be handled by the code for either external source or fission systems. The basic approach is to (1) approximate the spatial variation of the neutron source across each spatial subdivision as an expansion in terms of a user-supplied set of exponential basis functions; (2) solve analytically for the resulting neutron density inside each region; and (3) approximate this density in the basis function space in order to calculate the next iteration flux-dependent source terms. In the general case the calculation is iterative due to neutron sources which depend on the neutron density itself, such as scattering interactions.

34853 (INIS-SU—158) Nuclear constants. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.; Tsentral'nyj Nauchno-Issledovatel'skij Inst. Informatsii i Tekhniko-Ehkonomicheskikh Issledovanij po Atomnoj Nauke i Tekhnike, Moscow (USSR)). 1982. 48p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780523.

Separate abstracts were prepared for papers from this publication. (KAW)

34854 (LA-UR—83-1197) Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations. Clark, B.A.; Urban, W.T.; Dudziak, D.J. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 11p. (CONF-830538—4). NTIS, PC A02/MF A01. Order Number DE83011148.

From 6. international conference on radiation shielding; Tokyo, Japan (16 May 1983).

A new deterministic streaming technique called the Streaming Matrix Hybrid Method (SMHM) is applied to two realistic duct-shielding problems. The results are compared to standard discrete-ordinates and Monte Carlo calculations. The SMHM shows promise as an alternative deterministic streaming method to standard discrete-ordinates.

34855 Calculated initial energies of electrons in Si and SiO_2 irradiated by photons with energies up to 2 MeV. Todo, A.S.; Turner, J.E.; Hamm, R.N.; Wright, H.A. (Oak Ridge National Lab., TN (USA). Health and Safety Research Div.). *Nuclear Instruments and Methods in Physics Research;* **203**: No. 1-3, 459-465(1 Dec 1982).

Calculated spectra of initial energies are presented for electrons produced in Si and SiO_2 irradiated by monoenergetic photons with energies up to 2 MeV and by photons from ^{60}Co. The computations take into account the photoelectric effect, single Compton scattering of an incident photon, and emission of an Auger electron following creation of a K-shell vacancy in a Si or O atom. Pair production is neglected. The tables presented here can be used to calculate initial electron energy spectra for photons with an arbitrary energy spectrum up to 2 MeV.

34858 **Saturation of hot CO_2 by short 10.6 μm laser pulses.** Goldstein, J.C.; Czuchlewski, S.J.; Nowak, A.V. (Los Alamos National Lab., NM). *IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics;* QE-17: No. 7, 1299-1302(Jul 1981).

Saturation of the absorption of hot CO_2 by 1.6 ns P(18) and P(20) laser pulses at 10.6 μm has been measured. Coherent propagation calculations with no fitting parameters are in good agreement with the data and are consistent with a substantial hot-band contribution to the P(20) saturation.

34857 **Bounds and maximum principles for the solution of the linear transport equation.** Larsen, E.W. (Los Alamos Scientific Lab., NM). *SIAM (Society for Industrial and Applied Matheatics) Journal of Mathematical Analysis;* 12: No. 2, 282-292(Mar 1981).

Pointwise bounds are derived for the solution of time-independent linear transport problems with surface sources in convex spatial domains. Under specified conditions, upper bounds are derived which, as a function of position, decrease with distance from the boundary. Also, sufficient conditions are obtained for the existence of maximum and minimum principles, and a counterexample is given which shows that such principles do not always exist.

34850 **Status of gamma ray production cross section data.** Sugiyama, K. (Tohoku Univ., Sendai, Japan). *NBS Special Publication (United States);* No. 594, 397-407(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

The gamma rays produced by the interaction of neutrons with matter are important aspect of problem concerning the utilization of nuclear energy. This paper presents a review of the gamma ray production cross section in neutron energy of MeV; experimental measurements and theoretical calculations. Emphasis is given to the applied purpose rather than the nuclear structure studies described by van Heerden at Harwell Conference on Neutron Physics and Nuclear Data last year. Current measurements are discussed including not only the discrete lines but continuum fractions of the gamma rays. Some efforts on the theoretical calculations are presented for the explanations of the data.

34859 **Measurements and analyses of neutron transport through iron.** Hertel, N.E.; Johnson, R.H.; Dorning, J.J.; Wehring, B.W. (Univ. of Illinois, Urbana). *NBS Special Publication (United States);* No. 594, 563-567(Sep 1980). (CONF-791058—).

From International conference on nuclear cross sections for technology; Knoxville, TN, USA (22 Oct 1979).

Integral experiments have been performed using a thick homogeneous spherical shell of iron to test existing neutron cross section data. Neutron leakage spectra were measured for Cf-252-fission and DT-fusion neutron sources using an NE-213 spectrometry system. An associated particle detector monitored the absolute DT neutron source strength and the amount of DD neutron contamination in the DT source spectrum. The leakage spectra were calculated using the continuous-energy Monte Carlo code VIM and the discrete-S/sub n/ code ANISN. For neutron energies between 1 and 5 MeV, the calculations underpredicted the leakage spectrum by factors of 2 to 1.4 for the Cf neutron source and of 3 to 2 for the DT neutron source. The large discrepancies are attributed to inadequate representation of cross-section resonance structure (viz., minima); inadequate representation of the angular and secondary energy distributions for continuum inelastic scattering and (n, 2n) reactions may also contribute to these discrepancies.

6550 Medical Physics

REFER ALSO TO CITATION(S) 34526, 34534, 34554

34860 **(PB—83-125773) Guide for compliance with television receiver reporting and testing program requirements (21 CFR 1002.10 and 1002.12) - revision. Report for Mar 77-Aug 82.** (Bureau of Radiological Health, Rockville, MD (USA)). Aug 1982. 44p. NTIS, PC A03/MF A01.

As required by the Radiation Control for Health and Safety Act of 1968 and the regulations published subsequent to it, manufacturers of electronic products must submit certain reports pertaining to the radiation safety of the design and performance of these products. The manufacturer must certify that the product meets the applicable performance standard. An importer is concerned under the law to be the manufacturer. The reporting and recordkeeping requirements are specified in Part 1002 of the Regulations for the Administration of the Act. Section 1002.10 of the Regulations requires submission of an initial report prior to introduction of the first model of a regulated product into commerce. New models are to be described in model change reports in accordance with Section 1002.12, prior to their introduction into commerce. An Annual Report is required under the provisions of Section 1002.11. Appropriate labels (certification, identification, and date of manufacture) are to be attached to the electronic products in accordance with Sections 1010.2 and 1010.3.

34861 **(UCID—19791) Comparison of the SANDYL Monte-Carlo code calculations of 20.9-MeV bremsstrahlung with published experimental data.** Goosman, D.R. (Lawrence Livermore National Lab., CA (USA)). 27 Apr 1983. Contract W-7405-ENG-48. 12p. NTIS, PC A02/MF A01. Order Number DE83011772.

The new flash x-ray facility constructed at Site 300 of the Lawrence Livermore National Laboratory has a nominal operating electron energy of 20 MeV. The bremsstrahlung photons from this accelerator will be used for a variety of radiographic investigations of both thick and thin objects under explosively driven conditions. In order to properly design and interpret experiments, it is very useful to have a Monte-Carlo code to simulate the coupled electron-photon processes that occur both in the creation of the bremsstrahlung as well as in the collimation, the materials being radiographed and the detection system. One such code suitable for this purpose in many experimental situations is the SANDYL code, which has been used at this laboratory since 1974. This brief report is written to point out that if one uses the code's default values for some of the parameters involving the electron substep size, the code-predicted bremsstrahlung is higher than experimental data by about 60. This report also shows that as this parameter is made finer, the code prediction approaches the experimental results to within about 10. This report compares the published data of O'Dell et al for bremsstrahlung at 20.9 MeV with our SANDYL calculations. O'Dell et al used linac-produced bremsstrahlung to irradiate a D_2O secondary target cell. Neutrons from photodisintegration of the deuterium were energy analyzed by time-of-flight at 90° to the photon direction, and the disintegration cross-section tables were used to infer the bremsstrahlung spectrum and strength. Our SANDYL calculations for the angular distribution of photon MeV are compared to the data of Sandifer and George for the same target.

6560 Solid State Physics

34862 **(CBPF-NF—047/81) Majority rule model: real space renormalition group solution and finite size scaling.** Tsallis, C. (Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro). 1981. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701209.

Through a simple majority rule a statistical geometrical d-dimensional model(d can even be a fractal dimensionality) is formulated which presents a continuous phase transition as a function of a certain independent occupancy probability p. Both critical point p sub(c) and 'correlation length' exponent ν are exactly calculated through real space renormalization group (with linear scaling factor

b). The well known finite size scaling hypothesis ν (b)-$\nu\alpha$ 1/lnb (in the limit b→infinite) is analytically exhibited on a non trivial example presumably for the first time. A new and more rapidly convergent finite size scaling is sugested.

34863 (DOE/ER/10416—T2) NMR studies of fast-ion conductors. Villa, M. (Pavia Univ. (Italy). Ist. di Fisica). [nd]. Contract AT06-79ER10416. 15p. NTIS, PC A02/MF A01. Order Number DE83012445.

Portions are illegible in microfiche products.

NMR principles are reviewed, and NMR techniques which are likely to give a major contribution to studies of fast ion transport in solids are discussed. The NMR correlation function is defined, and examples are given and discussed. (WHK)

34864 (LA-UR—83-995) Possibility of studying crystal-field levels and excitations by μSR spectroscopy. Yaouanc, A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 6p. (CONF-830455—1). NTIS, PC A02/MF A01. Order Number DE83011312.

From Yamada conference on muon spin rotation and associated problems; Shimoda, Japan (18 Apr 1983).

We point out that μ^+SR relaxation times T_1 and T_2 measured in metallic magnetic materials can sometimes be expressed in terms of the spin-spin correlation functions of the magnetic ions. We calculate these functions in a random phase approximation and notice they can strongly depend on the crystal field levels and excitations of the magnetic ions. The shortcomings of this approximation are discussed.

34865 (LA-UR—83-1027) Magnetic-field dependence of impurity-induced muon depolarization in noble metals. Schillaci, M.E.; Heffner, R.H.; Hutson, R.L.; Leon, M.; Cooke, D.W.; Dodds, S.A.; Richards, P.M.; MacLaughlin, D.E.; Boekema, C. (Los Alamos National Lab., NM (USA); Rice Univ., Houston, TX (USA); Sandia National Labs., Albuquerque, NM (USA); California Univ., Riverside (USA); Texas Tech Univ., Lubbock (USA)). 1983. Contract W-7405-ENG-36. 8p. (CONF-830455—5). NTIS, PC A02/MF A01. Order Number DE83011330.

From Yamada conference on muon spin rotation and associated problems; Shimoda, Japan (18 Apr 1983).

We have measured the magnetic-field dependence of the muon depolarization rate up to 5 kOe in AuGd (350 ppM), AgGd (340 ppM) and AgEr (300 ppM). A simple model which includes both dipolar and nearest-neighbor contact interactions between the muon and the magnetic impurity does not fit the data. An axial crystal-field interaction, arising from the electric-field gradient induced by the muon at the site of the impurity, is found to dominate the Hamiltonian, and may have a large effect on the field dependence.

34866 Some optimization considerations in chopper inelastic neutron scattering experiments. Kimura, M.; Pelizzari, C.A.; Carpenter, J.M. (Argonne National Lab., IL (USA)). *Nuclear Instruments and Methods in Physics Research;* **203**: No. 1-3, 537-545(1 Dec 1982).

It has been common in the chopper inelastic neutron scattering experiments using a pulsed source to assume a certain experimental layout, such as the flight paths, chopper opening time and sample size etc., and calculate the expected counting rate together with the energy and momentum transfers and their widths (element of, Q, Δelement of, ΔQ). We start here, on the contrary, by setting element of, Q, Δelement of, and ΔQ to some predefined values, and then find out the instrument parameters that can yield the optimum counting rate. Two main cases were studied: (1) the case when the sizes of moderator, sample and detector width were taken to be adjustable to make the counting rate optimum; (2) taking the moderator width fixed, the optimum sizes of sample and detector were calculated. In both cases, the expected characteristics of the IPNS pulsed neutron source were assumed.

6570 Theoretical Physics

34867 (CONF-820331—, pp 522-526) Effect of grounded enclosure on the field distribution of rod-plane gaps. Safar, Y. (Univ. of Windsor, Ontario); Malik, N.H.; Qureshi, A.H.; Alexander, P.H. 1982. NTIS, PC A25/MF A01.

From 3. conference on gaseous dielectrics; Knoxville, TN, USA (7 Mar 1982).

This paper reports on electrostatic field computations for rod-plane gaps which are commonly used in corona and breakdown studies. A charge simulation technique has been used for these computations. Field factor which is defined as the ratio of the maximum to the average field in the gap is computed for rod-infinite plane and rod-finite plane inside grounded metallic pressure vessel for different values of gap length d to rod radius r ratio. The influence of the radius and length of the rod electrode, the radii of the plane electrode and the grounded pressure vessel, and the gap separation is examined for various cases. Based on the results of these computations, guidelines are proposed for the design, analysis and use of rod-plane gaps in corona and breakdown studies.

34868 (IC—80/147) Scattering matrix element of the three body reactive collision. Morsy, M.W.; Hilal, A.A.; El-Sabagh, M.A. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1980. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701174.

The optical model approximation has been applied to a previously derived set of coupled equations representing the dynamics of the three-body reactive scattering. The Schroedinger equation obtained describing the scattering problem has then been solved by inserting the effective mass approximation. The asymptotic requirements for both the entrance and exit channels, respectively, have been supplied to give the scattering matrix element of the reactive collision.

34869 (IC—81/5) Limitations of quantum measurements I: Determination of the minimal amount of non-ideality and identification of the optimal measuring apparatuses. Ghirardi, G.C.; Weber, T.; Miglietta, F.; Rimini, A. (International Centre for Theoretical Physics, Trieste (Italy)). Jan 1981. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701189.

The problem of determining the minimal deviation from the ideal scheme in a measurement, compatible with the existence of additive conserved quantities, is reconsidered. In the case of the measurement of a spin component of a spin-1/2 particle, we rederive in a simple and rigorous way the bound previously obtained by Yanase. The procedure allows the derivation of definite equations characterizing an optimal measuring apparatus. A detailed discussion of the possible malfunctioning of the apparatuses is also given.

34870 (IC—81/7) Ambiguities of functional integrals for fermionic systems. Cordero, P. (International Centre for Theoretical Physics, Trieste (Italy)). Jan 1981. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701190.

We study the path integral quantization of a purely fermionic system in the semiclassical approximation. It is crucial that the analogue of the usual method of stationary phase works for integrals over Grassmann variables. Our analysis is based on a quite trivial example (the exact solution is known), and therefore we can check when the results make sense. It is shown that just as in the boson case the path integral method depends on the discretization (we use the Faddeev discretization) and some attempts to do the same derivations directly in the continuous time limit are shown to yield either ill-defined objects or simply wrong results. It seems correct to conclude that the key point is the discretization.

34871 (IC—81/14) Limitations on quantum measurements II: Analysis of a model example. Ghirardi, G.C.; Weber, T.; Miglietta, F.; Rimini, A. (International Centre for Theoretical Physics, Trieste (Italy)). Feb 1981. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701183.

A solvable model of an apparatus for measuring a spin-component of a spin-1/2 particle is considered. The model enjoys full rotational invariance and, in the limit case in which a part of the apparatus becomes infinitely massive, works according to the ideal measurement scheme. The model is applied to the study of the deviations from the ideal measurement scheme imposed by the conservation of angular momentum. The detailed analysis of the model allows one to calculate the size of the various non-ideal terms in the measurement scheme and to understand the physical mechanism which gives rise to such terms.

34872 **(IC—81/22) Quantum limitations for spin measurements on systems of arbitrary spin.** Crisciani, F.; Ghirardi, G.C.; Weber, T.; Rimini, A. (International Centre for Theoretical Physics, Trieste (Italy)). Mar 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701184.

The existence of additive conserved quantities implies, as well known, an unavoidable error in the measurement of those observables which do not commute with the conserved quantities. We introduce a formal procedure to derive a lower bound for the error in the case of a measurement of a spin component for a quantum system of arbitrary spin.

34873 **(IC—81/26) Possibility of a fourth test of general relativity in earth's gravitational field.** Zhang Yuan-zhong. (International Centre for Theoretical Physics, Trieste (Italy)). Mar 1981. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701186.

In the paper the possibility for a fourth test of general relativity (i.e. relativistic time delay) in Earth's gravitational field is discussed. The effects of Earth's gravitational field on an interferometer and a resonant cavity are calculated by means of both two definitions of physical length.

34874 **(IC—81/32) Approximate solution with torsion for a charged particle in a gauge theory of gravitation.** Zhang Yuan-zhong. (International Centre for Theoretical Physics, Trieste (Italy)). Apr 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701187.

In this paper a method of finding an approximate solution of field equations in a gauge theory of gravitation is given by means of physical considerations. Using this method, an approximate solution of the field of a charged particle in a gauge theory of gravitation, a space-time metric and torsion tensors, is obtained. This method can also be used to solve field equations in other gauge theories of gravitation.

34875 **(IC—81/75) Recursive formula for the evaluation of <psi'T-circumflexsub(μnu)(x)'psi> and its application in the semi-classical theory of gravity.** Randjbar-Daemi, S. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1981. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701191.

For a quantum field coupled to a classical background gsub(μnu)-field we propose a recursive technique which relates the diagonal matrix element <psi'T-circumflexsub(μnu)'psi> to its value at t=-infinity. We then employ the lowest non-trivial order to renormalize the semi-classical theory of gravity. The existence of two important classes of solutions of the linearized theory is briefly discussed.

34876 **(IC—81/79) Some aspects of gravitational waves in an isotropic background universe.** Pandey, S.N. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701192.

Gravitational waves are an inescapable consequence of the relativistic theory of gravitation. They are meaningfully comparable with electromagnetic waves. However, they are not conformally invariant. So, to investigate this property for gravitational waves, modified field equations are obtained of which the underlying Lagrangian is based on gravitation only. It gives, if helicity is preserved, amplitude modification, and the wave is represented by Bessel function of zero order. Some aspects of this theory are discussed with reference to gravitational waves only.

34877 (INIS-mf—7626(Vol.1), pp vp) **Random magnetism.** Tsallis, C. (Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro:. 1981. NTIS (US Sales Only), PC A11/MF A01. (CONF-800155—Vol.1).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

The 'ingredients' which control a phase transition in well defined systems as well as in random ones (e.q. random magnetic systems) are listed and discussed within a somehow unifying perspective. Among these 'ingredients' the couplings and elements responsible for the cooperative phenomenon, the topological connectivity as well as possible topological incompatibilities, the influence of new degrees of freedom, the order parameter dimensionality, the ground state degeneracy and finally the 'quanticity' of the system are found. The general trends, though illustrated in magnetic systems, essentially hold for all phase transitions, and give a basis for connection of this area with Field theory, Theory of dynamical systems, etc.

34878 **(INIS-mf—7626(Vol.1)) Proceedings of the sixth symposium on theoretical physics. Nuclear physics, plasma physics and statistical mechanics.** Ferreira, E.M.; Koiller, B. (eds.). (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, Rio de Janeiro (Brazil)). 1981. 217p. (CONF-800155—Vol.1). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83780489.

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

Selected papers were abstracted separately.

34879 (INIS-mf—7626(Vol.3), pp vp) **Geometric formulation of supergravity.** MacDowell, S.W. (Yale Univ., New Haven, CT (USA)). 1981. NTIS (US Sales Only), PC A09/MF A01. (CONF-800155—Vol.3).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

A formulation of supergravity and extended supergravity is presented in which both the gauge invariance and the invariance under general coordinate transformations are given a unified geometrical interpretation. The appropriate mathematical formalism used is the theory of Fibre Bundles.

34880 (INIS-SU—144, pp vp) **Hydrodynamic asymptotics of correlation functions with account of fluctuations.** Plokhov, S.S.; Prikhod'ko, V.I. 1981. (In Russian). NTIS (US Sales Only), PC A05/MF A01.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.

In Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection.

Asymptotics of Fourier-components of Ssub(p)wa(x vector, t)b(0) correlation functions (w-Gibbs distribution) at t>>tausub(r) (tausub(r) - time of relaxation) is determined within the frames of the statistical theory of non-equilibrium fluctuations of hydrodynamic values. In particular, asymptotics of correlation functions determining the coefficients of thermal conductivity, first and second viscosity is obtained from these asymptotics.

34881 **(LBL—15254) Computer studies of multiple-quantum spin dynamics.** Murdoch, J.B. (Lawrence Berkeley Lab., CA (USA)). Nov 1982. Contract AC03-76SF00098. 410p. NTIS, PC A18/MF A01. Order Number DE83011589.

Portions are illegible in microfiche products; Thesis.

The excitation and detection of multiple-quantum (MQ) transitions in Fourier transform NMR spectroscopy is an interesting problem in the quantum mechanical dynamics of spin systems as well as an important new technique for investigation of molecular structure. In particular, multiple-quantum spectroscopy can be used to simplify overly complex spectra or to separate the various interactions between a nucleus and its environment. The emphasis of this work is on computer simulation of spin-system evolution to better relate theory and experiment.

34882 (MPQ—68) Gravitational wave detection by laser interferometry. Ruediger, A.; Schilling, R.; Schnupp, L.; Winkler, W.; Billing, H.; Maischberger, K. (Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.)). Nov 1982. 25p. Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.).

At several laboratories, laser interferometers are being developed to detect gravitational radiation which induces extremely small strains deltal/l in space, of as little as 10^{-18} and even 10^{-21} (supernovae in our galaxy and in the Virgo cluster, respectively). The signals are believed to last only a few milliseconds, with most of the signal power concentrated in a signal frequency band ranging from a few hundred to several thousand hertz. All prototype interferometers currently under investigation use multiple reflection schemes to increase the optical path and thus to enhance the sensitivity. Even then, the interferometer must be able to resolve something like $2x10^{-10}$ of a fringe. Fortunately, this extreme sensitivity is required only in the limited signal frequency band. A number of noise mechanisms make it difficult, however, to reach this goal. A very fundamental limit results from the photon counting noise (shot noise in the photodiodes). This limit can be overcome by rather unrealistic laser powers (> 100 W single mode), but also by "recycling" the unused light in the interferometer. The category of mechanical noise (seismic, acoustic and thermal excitation of the interferometer components) plays a prominent role, particularly at low frequencies. Although the means of reducing this noise are not trivial, they will only be briefly discussed here. The major emphasis is placed on the noise introduced by the illuminating laser, namely by its fluctuations in light power, in frequency, and in beam geometry (such as a lateral jitter). These three noise sources have in common that they only become apparent when accompanied by appropriate asymmetries in the interferometer.

34883 (RRK—81-24) Some properties of the symmetry axis in a superpostion of two Kerr solutions. Kihara, M.; Tomimatsu, A. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Sep 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701204.

Some properties of the symmetry axis of the metric which represents a superposition of two Kerr solutions are investigated. It is proved that a segment on the axis between the two horizons displays the structure of a peculiar 2-surface on which there exist closed timelike curves.

34884 (RRK—81-25) Invariant systems under the space-time inversion. Existence of the two kinds of the invesions. Shintani, M. (Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics). Sep 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701205.

Restricting ourselves to the scale and conformal invariant systems, we investigate their invariance (or noninvariance) properties with respect to the inversions at the classical level. By employing some rules, for some dynamical variables we obtain the representation of the inversions with the radius $^{+}a^{+}$ and encounter the two kinds of representations corresponding to $a > 0$ and $a < 0$. We point out that the distinction of the two kinds of inversions, i.e., the P.I. for $a > 0$ and the N.I. for $a < 0$, is decisive for the spinor systems of the conventional kinetic term (i anti psi γtheta psi). Especially, the massless spinor-QED and the QCD with the vanishing quark masses are not invariant under the P.I. but invariant under the N.I. with some conditions. It is seen that the requirement of the inversion symmetry of a dynamics is more restrictive than that of the scale or conformal symmetry.

34885 Accelerating convergence in automatic lens design. Brixner, B. *Applied Optics;* **20**: No. 14, 2452-2456(15 Jul 1981).

Among the various factors that slow lens optimization-insufficient performance targets, the absence of a unique solution, false local minima, a poorly scaled change vector, failure to find the optimum damping number, and failure to equalize the parameter gradients-the importance of parameter gradient equalization has been insufficiently recognized. Gradients can be approximately equalized by scaling the lens to a suitable size while it is being optimized. For best results, the size of the damping number should also be optimized during each iteration. If these two procedures are followed, scaling the change vector is usually not crucial. To illustrate the importance of parameter equalization, a lens optimization is analyzed.

34886 Variational approach to the statistical mechanics of hard discs and hard spheres. MacCarthy, J.E. (Univ. of Notre Dame, IN); Kozak, J.J.; Green, K.A.; Luks, K.D. *Molecular Physics;* **44**: No. 1, 17-31(1981).

The theory of complementary variational principles is used to obtain analytic approximations to hard disc and hard sphere pair correlation functions in the high density regime. The Yvon-Born-Green non-linear integral equation (under the superposition closure) is studied and earlier theoretical studies of this equation are drawn upon, particularly those which deal with the short range and asymptotic form of the YBG pair correlation function in short range and asympotic form of the YBG pair correlation function in d-dimensions, to motivate possible choices of the variational trial functions. These functions are optimized in accordance with extremum principles of the theory and the results are compared with existing numerical solutions of the YBG equation for hard discs and hard spheres. It is found that the analytic functions determined via the method of complementary variational principles are in excellent accord with the numerical data, even to the extent of indicating the onset of a fluid-periodic transition in the (very) high density regime. The relevance of this work to the problem of stability in hard disc and hard sphere systems is stressed in the concluding section of the paper.

34887 Computer modeling of antennas near the ground. Burke, G.J.; Miller, E.K.; Brittingham, J.N.; Lager, D.L.; Lytle, R.J.; Okada, J.T. (Lawrence Livermore National Lab., CA). *Electromagnetics;* **1**: 29-49(1981). Contract W-7405-ENG-48.

An accurate and efficient numerical method based on the rigorous Sommerfeld theory is described for modeling antennas near an interface such as the ground. The Sommerfeld integrals are evaluated by numerical integration along contours in the complex plane and two-dimensional interpolation is used subsequently to obtain the many Sommerfeld integral values needed for the moment-method solution of an integral equation. These methods permit modeling an antenna within 10^{-6} wavelengths of the ground for about two to four times the computation time for the same antenna in free space. Results showing currents and radiation patterns are included.

6580 Mathematical Physics

34888 (IC—80/192) Breakdown of predictability: an investigation on the nature of singularities. Tahir Shah, K. (International Centre for Theoretical Physics, Trieste (Italy)). Dec 1980. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701177.

When relations are extrapolated beyond their premises of discovery, the operation sometimes results in an undefined object, i.e., one which cannot be identified within the given structure. The thesis is put forth that the occurrence of singularities is due to "incompleteness" in knowledge. An intuitive answer on how to deal with singularities (in, for instance, the real number system, space-time, quantum field theory) is presented first. Then a quasi-formalistic approach, e.g. non-standard models in higher-order languages and Lawvere's axiomatic formulation of categories, is set out. The independence of singularity with respect to other primitive notions of the Universe of knowledge is noted.

34889 (IC—81/25) Irreducible representations of the simple Lie groups II - the tensor basis for the infinitesimal generators of the exceptional groups. Sun Hong-zhon; Han Qi-zhi. (International Centre for Theoretical Physics, Trieste (Italy)). Mar 1981. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701185.

We have already analysed the commutation relations of the infinitesimal generators of all simple classical Lie groups and established a new basis for these generators, called the tensor basis. In

tensor basis, the infinitesimal generators can be written as some scalar operators, some sets of angular momentum operators and some sets of irreducible tensor operators. Now we give the tensor basis for the exceptional simple Lie groups. By means of the method that has been used in the earlier papers, "On the irreducible representations of the compact simple Lie groups of rank 2, I, II, III" and the tensor basis, the irreducible representations of the exceptional Lie groups can be calculated more easily than usual.

34890 **(IC—81/95) Conference on differential geometric methods in theoretical physics, 30 June - 3 July 1981. Extended abstracts.** (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1981. 48p. (CONF-810766—Absts.). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701195.

From Conference on differential geometric methods in theoretical physics; Trieste, Italy (1 Jul 1981).

The conference programme and abstracts of the lectures and seminars presented are reproduced here. Full texts will be published in the conference proceedings.

34891 **(IC—81/115) Localizability of massless particles in the framework of the conformal group.** Bayen, F.; Niederle, J. (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701179.

Localizability of massless particles in the framework of the conformal group is studied by means of imprimitivity systems for particular representations of the de Sitter group $SO_0(4,1)$.

34892 **Balancing the generalized eigenvalue problem.** Ward, R.C. (Union Carbide Corp. Oak Ridge, TN). *SIAM Journal on Scientific and Statistical Computing;* 2: No. 2, 141-152(Jun 1981). Contract W-7405-ENG-26.

An algorithm is presented for balancing the A and B matrices prior to computing the eigensystem of the generalized eigenvalue problem $Ax = \lambda Bx$. The three-step algorithm is specifically designed to precede the QZ-type algorithms, but improved performance is expected from most eigensystem solvers. Permutations and two-sided diagonal transformations are applied to A and B to produce matrices with certain desirable properties. Test cases are presented to illustrate the improved accuracy of the computed eigenvalues.

6590 Communication, Education, History, And Philosophy

REFER ALSO TO CITATION(S) 34952

70 FUSION ENERGY

34893 **(DOE/NBM—3012256) Magnetic-fusion program.** (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). Aug 1980. 39p. NTIS, PC A03/MF A01. Order Number DE83012256.

In February 1980, the Director of Energy Research requested that the Energy Research Advisory Board (ERAB) review the Department of Energy (DOE) Magnetic Fusion Program. Of particular concern to the DOE was the judicious choice of the next major steps toward demonstration of economic power production from fusion. Of equal concern was the overall soundness of the DOE Magnetic Fusion Program: its pace, scope, and funding profiles. Their finding and recommendations are included.

7001 Plasma Research

REFER ALSO TO CITATION(S) 34804

34894 **(DOE/ET/53088—90) Non-Maxwellian ion distributions caused by neoclassical heat conduction.** Ware, A.A. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Apr 1983. Contract FG05-80ET53088. 13p. NTIS, PC A02/MF A01. Order Number DE83011490.

It is shown that in tokamaks with neoclassical banana regime heat conduction and ion self collisions dominant for energy scattering, the distribution tail diffuses outwards radially and downwards in energy maintaining a constant effective temperature (- delta lnf/ sub i//delta epsilon)$^{-1}$, as observed in some experiments.

34895 **(IPF—82-2) Numerical simulation of echo phenomena in plasma.** Schulze, E. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung). Apr 1982. 109p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750072.

A numerical method developed by Erz, which solves the Vlasov- and the Poisson-equation in a selfconsistent manner, is used for the plasma simulation. Langmuir waves, the two-stream instability and the gentle-bump instability are treated as examples for plasma wave phenomena. The results of the analytical and the numerical solution of the dispersion equation and the results of the plasma simulation are compared. The numerical investigation of echos by plasma simulation confirmes for small amplitudes of the plasma waves the analytical perturbation calculation of second order. The plasma simulation of echos for large amplitudes of the plasma waves leads to echos of higher order. Echos of sixth and seventh order are shown, the dependence of the echo amplitude on the pulse amplitudes is given. The plasma simulation for unstable distributions shows the transition of the echo to an instability.

34896 **(IPF—82-4) Selection criteria on laser-detector systems for scattering-diagnostics of fusion-plasmas.** Hirsch, K. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung). May 1982. 38p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750064.

Different laser-detector combinations for Thomson scattering experiments are compared. Three cases can be treated in which either detector or background or signal noise dominates the detection of scattered light. Criteria are derived on the basis of analytical results.

34897 **(IPF—82-5) Theory of neutron spectra from d-d-reactions in the linear z-pinch and the plasma focus.** Deutsch, R.; Kaeppeler, H.J. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung). May 1982. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750073.

Because of a finite gyroradius effect, the equilibrium probability density function of the ions in the azimuthal magnetic field of a linear z-pinch becomes anisotropic. This density function was derived by solving the Vlasov equation and used to determine the neutron spectra produced in the deuterium plasma of a z-pinch. The neutron spectra were calculated for two models, differing in the energy distribution of the fast ions. A background plasma with 'slow' ions was also considered. The interactions of the fast ions with the slow ions and 'beam-beam' interactions between fast ions were considered. Typical spectra for arbitrary directions to the cylindrical axis are given. The anisotropy factors were calculated. Considering the influence of the azimuthal magnetic field on the equilibrium density function of the deuterons, the well known particularities of the neutron spectra are obtained without any of the contradictions typical of the traditional models.

34898 **(IPF—82-7) Calculation of turbulence phenomena in plasma focus dynamics using REDUCE.** Hayd, A.; Maurer, M.; Meinke, P.; Kaeppeler, H.J. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung). May 1982. 41p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750065.

Also published as M.A.N.-report B 099 042-EDS-020.

Based on previous calculations of the development of highly turbulent plasma states resulting from m=0 instabilities and the application to the turbulent development in the late stage of a plasma focus experiment, using REDUE, the treatment of plasma focus dynamics is extended to the compression stage and 'intermediate' stage between maximum density and m = o onset. For this, a two-fluid model of the magneto-fluid dynamic equations is employed. The non-linear development is again treated in ω, k-space and transformed back into r, t-space to obtain local dynamic variables as functions of time. The calculation is applied to the Stuttgart

plasma focus experiment POSEIDON. It is shown that for relatively high pinch currents, neutron production also appears in the 'intermediate' phase, the life-time of which increases with increasing pinch current.

34899 **(JAERI-M—9902) Negative ion formation and neutralization processes, (1). Related to plasma heating by 'negative ion based neutral beam injection'.** Sugiura, Toshio. (Japan Atomic Energy Research Inst., Tokyo). Jan 1982. 72p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701208.

This review has been made preliminary for the purpose of contribute to the plasma heating by "negative ion based neutral beam injection" in the magnetic confinement fusion reactor. A compilation includes the survey of the general processes of negative ion formation, the data of the cross section of H^- ion formation and the neutralization of H^- ion, and some of new processes of H^- ion formation. The data of cross section are mainly experimental, but partly include the results of theoretical calculation.

34900 **(ORNL/TM—8403) Electron heating and superthermal electron enhancement due to electron cyclotron heating in ISX-B at 28 GHz.** Elder, G.B.; Hsuan, H.; England, A.C. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 25p. NTIS, PC A02/MF A01. Order Number DE83012307.

A series of electron cyclotron heating (ECH) experiments was performed with a 28-GHz gyrotron on the Impurity Study Experiment (ISX-B) tokamak at Oak Ridge National Laboratory. Up to 70 kW of microwave power was injected into ISX-B from the high field side. Bulk heating was observed with a central temperature rise of $\sim$ 370 eV from an original temperature of $\sim$ 600 eV, as measured by Thomson scattering. With ECH and under low density conditions, large nonthermal signals were observed on electron cyclotron emission diagnostics at the first, second, and third harmonics. These signals sometimes became quite large after the end of the ECH pulse. The effects observed can be attributed to relatively small changes in the electron distribution function. The temporal behavior of the enhanced emission is tentatively attributed to the pitch angle scattering of superthermal electrons.

34901 **(ORNL/TM—8467) Resonant ion transport in EBT.** Hastings, D.E.; Jaeger, E.F.; Hedrick, C.L.; Tolliver, J.S. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 65p. NTIS, PC A04/MF A01. Order Number DE83012141.

We use a model for the ELMO Bumpy Torus as a bumpy cylinder with a toroidally induced vertical drift imposed on the plasma. With this model we obtain the neoclassical plasma-transport coefficients for ions in both the banana and plateau resonant regimes. The problem of solving the linearized bounce-averaged drift kinetic equation is formulated as a variational principle, which is shown to be valid for both the banana and plateau regimes. We use limiting forms of this principle to obtain a continuous collisionality approximation to the energy-dependent flux. We then use this approximation to obtain analytic formulae for the particle- and energy-diffusion coefficients. These are shown to give excellent agreement with numerical results.

34902 **(ORNL/TM—8648) MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation.** Carreras, B.A.; Dunlap, J.L.; Cooper, W.A. (Oak Ridge National Lab., TN (USA); Texas Univ., Austin (USA). Inst. for Fusion Studies). Jun 1983. Contract W-7405-ENG-26. 62p. NTIS, PC A04/MF A01. Order Number DE83012340.

The observed spectrum of magnetohydrodynamic (MHD) fluctuations in the Impurity Study Experiment (ISX-B) tokamak is clearly dominated by the $n = 1$ mode when the $q = 1$ surface is in the plasma. This fact agrees well with theoretical predictions based on three-dimensional (3-D) resistive MHD calculations. They show that the ($m = 1$; $n = 1$) mode is the dominant instability. It drives other $n = 1$ modes through toroidal coupling and $n > 1$ modes through nonlinear couplings. These theoretically predicted mode structures have been compared in detail with the experimentally measured wave forms (using arrays of soft x-ray detectors). The agreement is excellent. More detailed comparisons between theory and experiment have required careful reconstructions of the ISX-B equilibria. The equilibria so constructed have permitted a precise evaluation of the ideal MHD stability properties of ISX-B. The present results indicate that the high-beta ISX-B equilibria are marginally stable to finite-n ideal MHD modes.

34903 **(PPPL—1990) Modeling of ICRF heating of a tokamak plasma.** Hwang, D.Q.; Karney, C.F.F.; Hosea, J.C.; Hovey, J.M.; Singer, C.E.; Wilson, J.R. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1983. Contract AC02-76CH03073. 29p. NTIS, PC A03/MF A01. Order Number DE83012421.

A model for wave propagation and absorption of the Ion Cyclotron Range of Frequencies (ICRF) has been constructed and fitted into the 1-D BALDUR transport code. The wave propagation is handled by ray tracing techniques. Wave absorption is calculated using the Fokker-Planck equation and quasilinear diffusion. The wave propagation and damping profiles are evolved in time according to the plasma evolution. A simulation of PLT hydrogen minority ICRF heating with a comparison to experimental data is given.

34904 **(PPPL—1995) High-energy tritium beams as current drivers in tokamak reactors.** Mikkelsen, D.R.; Grisham, L.R. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1983. Contract AC02-76CH03073. 19p. NTIS, PC A02/MF A01. Order Number DE83012426.

The effect on neutral-beam design and reactor performance of using high-energy ($\sim$ 3-10 MeV) tritium neutral beams to drive steady-state tokamak reactors is considered. The lower current of such beams leads to several advantages over lower-energy neutral beams. The major disadvantage is the reduction of the reactor output caused by the lower current-drive efficiency of the high-energy beams.

34905 **(PPPL—1996) Application of the stellarator expansion for plasma-stability studies in stellarators.** Anania, G.; Johnson, J.L. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1983. Contract AC02-76CH03073. 29p. NTIS, PC A03/MF A01. Order Number DE83012425.

A numerical code, which utilizes the stellarator expansion, is developed and tested. It is used to investigate the magnetohydrodynamic stability properties of several stellarator configurations, including Heliotron E, Wendelstein VII-A, a modular-coil device, and ATF-1.

34906 **(PPPL—1999) Pulse pile-up effects.** Tenney, F.H. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1983. Contract AC02-76CH03073. 43p. NTIS, PC A03/MF A01. Order Number DE83012430.

The energy spectrum containing the effects of all orders of pulse pileup is predicted for an idealized x-ray pulse-height-analysis system measuring randomly occurring events. Two simplifying assumptions used are first a fixed pulse resolution time and second that the measured energy of piled-up pulses is the algebraic sum of the energy associated with each pulse.

34907 **(PPPL—2007) Reduced equations for internal kinks in tokamaks.** Izzo, R.; Monticello, D.A.; Strauss, H.R.; Park, W.; Manickam, J.; Grimm, R.C.; DeLucia, J. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1983. Contract AC02-76CH03073. 17p. NTIS, PC A02/MF A01. Order Number DE83012432.

A reduced set of ideal MHD equations is derived for large aspect ratio, low β tokamaks that adequately describes the linear and nonlinear evolution of ideal internal kink modes in tokamaks.

34908 **(UCRL-Trans—11858) Axisymmetric ambipolar trap.** Dimov, G.I. (Lawrence Livermore National Lab., CA (USA)). May 1983. Contract W-7405-ENG-48. Translation of Preprint 82-150, 1982 Institut Yadernobi Fizika. 18p. NTIS, PC A02/MF A01. Order Number DE83011415.

Portions are illegible in microfiche products.

A preliminary analysis of a new completely axisymmetic ambipolar trap is given. This scheme calls for MHD stabilization of

the plasma in a trap by individual axisymmetric probktrons fashioned on the basis of cusp geometries. In the peripheral conical regions of the cusp adiabatic confinement of fast ions is possible. In these regions it is proposed that conical bunches of hot plasma which are sufficiently elongated along magnetic lines be maintained. (MOW)

7002 Fusion Power Plant Technology

REFER ALSO TO CITATION(S) 34229

34909 **(ANL/FPP/TM—171) Charge state of sputtered impurity ions near a limiter or divertor in a tokamak.** Boley, C.D.; Brooks, J.N.; Kim, Y.K. (Argonne National Lab., IL (USA)). Mar 1983. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01. Order Number DE83012305.

Many impurity atoms sputtered from a limiter or divertor plate are ionized in the scrapeoff zone and return to the sputtering surface because of friction with incoming plasma ions. The final charge state attained by such impurities has been calculated for a variety of plasma edge conditions. The surface materials considered are tungsten, beryllium, beryllium oxide, and carbon. Estimates of the successive ionization cross sections for tungsten are developed. In all cases examined, returning impurity ions are found to be multiply ionized. This implies a significant energy gain in the sheath region, with important implications for self-sputtering of redeposited surface material.

34910 **(ANL/FPP/TM—173) INTOR impurity control and first wall system.** Abdou, M.A. (Argonne National Lab., IL (USA)). Apr 1983. Contract W-31-109-ENG-38. 28p. NTIS, PC A03/MF A01. Order Number DE83012381.

The highlights of the recent INTOR effort on examining the key issues of the impurity control/first wall system are summarized. The emphasis of the work was an integrated study of the edge-region physics, plasma-wall interaction, materials, engineering and magnetic considerations associated with the poloidal divertor and pump limiter. The development of limiter and divertor collector plate designs with an acceptable lifetime was a major part of the work.

34911 **(CONF-811174—6) Generation of a strong core-centering force in a submillimeter compound droplet system.** Lee, M.C.; Feng, I.; Elleman, D.D.; Wang, T.G.; Young, A.T. (Jet Propulsion Lab., Pasadena, CA (USA); Los Alamos National Lab., NM (USA)). 1981. Contract AI08-82DP40172. 6p. NTIS, PC A02/MF A01. Order Number DE83011258.

From 2. convention of the international colloquium on drops and bubbles; Monterey, CA, USA (19 Nov 1981).

Portions are illegible in microfiche products.

By amplitude-modulating the driving voltage of an acoustic levitating apparatus, a strong core-centering force can be generated in a submillimeter compound droplet system suspended by the radiation pressure in a gaseous medium. Depending on the acoustic characteristics of the droplet system, it has been found that the technique can be utilized advantageously in the multiple-layer coating of an inertial-confinement-fusion pellet.

34912 **(CONF-830406—38) Neutron activation in EBT-P.** Driemeyer, D.E. (McDonnell Douglas Astronautics Co., St. Louis, MO (USA)). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83012070.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Neutron activation due to photoneutron production in the lead shields proposed to protect the EBT-P superconducting coils from excessive x-ray heating was investigated. The photoneutron flux distribution in various EBT-P structural components was calculated for typical upgrade operating conditions using a standard two-dimensional transport model (TWOTRAN). Activity levels were then evaluated for major structural materials using activation cross sections tabulated in the GAMMON library. Activation dose rates in the device enclosure following several days of 8h/day upgrade (90GHz) operation were found to be ~ 6 mrem/h, decaying to <0.25 mrem/h in ~ 3 days. This requires radiation monitoring of all personnel entering the device enclosure during this time, but should not generally restrict hands on access to the device. There is thus no strong motivation to replace lead with another shield material; however, it may be desirable to borate the enclosure walls in order to reduce the effect which impurities might have on activity levels.

34913 **(CONF-830406—40) First-wall-coating candidates for ICF reactor chambers using dry-wall protection only.** Sink, D.A. (Westinghouse Electric Corp., Madison, PA (USA). Advanced Energy Systems Div.). 1983. Contract AC08-81DP40146. 7p. NTIS, PC A02/MF A01. Order Number DE83012455.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

Twenty pure metals were considered as potential candidates for first-wall coatings of ICF reactor chambers. Seven were found to merit further consideration based on the results of computer-code calculations of figures-of-merit. The seven are rhenium, iridium, molybdenum, chromium, tungsten, tantalum, and niobium (listed in order of decreasing values of figures-of-merit). The calculations are based on mechanical, thermal, and vacuum vaporization engineering constraints. A number of alloys of these seven metals are suggested as additional candidates.

34914 **(CONF-830406—41) Fluidized-bed design for ICF reactor blankets using solid-lithium compounds.** Sucov, E.W.; Malick, F.S.; Green, L.; Hall, B.O. (Westinghouse Electric Corp., Madison, PA (USA)). 1983. Contract AC08-81DP40146. 5p. NTIS, PC A02/MF A01. Order Number DE83012454.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

A fluidized-bed concept for blankets of dry or wetted first-wall ICF reactors using solid-lithium compounds is described. The reaction chamber is a right cylinder, 32 m high and 20 m in diameter; the blanket is composed of 36 steel tanks, 32 m high, which carry the sintered Li_2O particles in the fluidizing helium gas. Each tank has a radial thickness of 2 m which generates a tritium breeding ration (TBR) of 1.27 and absorbs over 98% of the neutron energy; reducing the thickness to 1.2 m produces a TBR of 1.2 and energy absorption of 97% which satisfy the design goals. Calculations of tritium diffusion through the grains and heat removal from the grains showed that neither could be removed by the carrier gas; tritium and heat are therefore removed by removing the grains themselves by varying the helium flow rate. The particles are continuously fed into the bottom of the tanks at 300°C and removed at the top at 475°C. Tritium and heat extraction are easily and conveniently done outside the reactor.

34915 **(CONF-830406—42) Overview of first wall/blanket/shield technology.** Nygren, R.E. (Argonne National Lab., IL (USA)). Apr 1983. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01. Order Number DE83011725.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

This brief overview of first wall, blanket, and shield technology focuses first on changes and trends in important design issues from the 1970's to the 1980's, then on current perceptions of critical issues in first wall, blanket, and shield design and related technology. The emphasis is on base technology rather than either systems engineering or materials development, on the two primary confinement systems, tokamaks and mirrors, and on production of electricity as the primary goal for development.

34916 **(CONF-830406—44) Effects of tritium contamination in the FED/INTOR reactor hall.** Finn, P.A.; Rogers, M.L. (Argonne National Lab., IL (USA); Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83011755.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

The purpose of this study was to determine the constraints imposed on the FED/INTOR fusion plants by tritium contamination in the reactor hall. Limitations imposed by gamma-radiation levels and the maintenance philosophy adopted were included. The cost (capital and operation) required to maintain 5, 50, and 500 $\mu Ci/m^3$ was evaluated. Three different maintenance strategies (unsuited worker, suited worker and robotics) were suited to determine if tritium contamination placed a constraint on reactor availability.

34917 **(CONF-830406—45) Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket.** Misra, B.; Smith, D.L.; Burk, R.C.; Morgan, G.D. (Argonne National Lab., IL (USA); McDonnell Douglas Astronautics Co., St. Louis, MO (USA)). Mar 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE83011695.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

Liquid lithium-lead eutectic alloy (17 at % Li-83 at % Pb, referred to herein as Li-Pb) is currently being considered as a candidate breeding material for fusion reactors. Some important considerations in the design of a Li-Pb blanket are compatibility with the structure, tritium containment and recovery, and safety. Additional design complexities arise because of the high density of Li-Pb, the relatively high melting temperature (235°C), and the high tritium over-pressure associated with this alloy. In this study, the Li-Pb eutectic was considered both as the breeder and as the coolant. Thermal hydraulic and stress analyses were conducted to assess the technical feasibility of using Li-Pb as the breeder and coolant based on DEMO reactor conditions. The results of the thermo-mechanical analyses showed that the elongated cylindrical blanket modules made from either HT-9 or vanadium alloy offer a viable first wall/blanket design concept.

34918 **(CONF-830406—46) Wall tritium contamination as a factor in fusion-reactor wall design.** Finn, P.A.; Leonard, R.A.; Rogers, M.L.; Sienkiewicz, C.J. (Argonne National Lab., IL (USA); Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1983. Contract W-31-109-ENG-38. 8p. NTIS, PC A02/MF A01. Order Number DE83011729.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

The effect of either concrete or stainless steel walls on the cleanup time required to attain tritium (HTO) atmospheric levels $\leq$ 0.5 mCi/m^3 was assessed. Calculations were performed for concrete; experimental results are presented for stainless steel.

34919 **(CONF-830406—47) Lifetime analysis of fusion-reactor components.** Mattas, R.F. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01. Order Number DE83011700.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

A one-dimensional computer code has been developed to examine the lifetime of first-wall and impurity-control components. The code incorporates the operating and design parameters, the material characteristics, and the appropriate failure criteria for the individual components. The major emphasis of the modelling effort has been to calculate the temperature-stress-strain-radiation effects history of a component so that the synergystic effects between sputtering erosion, swelling, creep, fatigue, and crack growth can be examined. The general forms of the property equations are the same for all materials in order to provide the greatest flexibility for materials selection in the code. The code is capable of determining the behavior of a plate, composed of either a single or dual material structure, that is either totally constrained or constrained from bending but not from expansion. The code has been utilized to analyze the first walls for FED/INTOR and DEMO.

34920 **(CONF-830406—48) Electromagnetic effects on the FED/INTOR limiter.** Turner, L.R.; Foss, M.H. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE83011745.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Electromagnetic effects were among the critical issues of the impurity control system examined in the 1982 FED/INTOR design study. During a plasma disruption, the decaying plasma current induces voltages and currents in the first wall and limiter systems which can produce arcing between limiter segments and large forces and torques on the limiter. The effects of first wall time constant, limiter electrical resistance, and limiter segmentation on the voltages, forces, and torques were studied.

34921 **(CONF-830406—49) Demonstration tokamak power plant.** Abdou, M.; Baker, C.; Brooks, J.; Ehst, D.; Mattas, R.; Smith, D.L.; DeFreece, D.; Morgan, G.D.; Trachsel, C. (Argonne National Lab., IL (USA); McDonnell Douglas Astronautics Co., St. Louis, MO (USA)). 1983. Contract W-31-109-ENG-38. 15p. NTIS, PC A02/MF A01. Order Number DE83011751.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

A conceptual design for a tokamak demonstration power plant (DEMO) was developed. A large part of the study focused on examining the key issues and identifying the R and D needs for: (1) current drive for steady-state operation, (2) impurity control and exhaust, (3) tritium breeding blanket, and (4) reactor configuration and maintenance. Impurity control and exhaust will not be covered in this paper but is discussed in another paper in these proceedings, entitled Key Issues of FED/INTOR Impurity Control System.

34922 **(CONF-830406—50) EBT-P gamma-ray-shielding analysis.** Gohar, Y. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 10p. NTIS, PC A02/MF A01. Order Number DE83011752.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

First, a one-dimensional scoping study was performed for the gamma-ray shield of the ELMO Bumpy Torus proof-of-principle device to define appropriate shielding material and determine the required shielding thickness. The dose-equivalent results are analyzed as a function of the radiation-shield thickness for different shielding options. A sensitivity analysis for the pessimistic case is given. The recommended shielding option based on the performance and cost is discussed. Next, a three-dimensional scoping study for the coil shield was performed for four different shielding options to define the heat load for each component and check the compliance with the design criterion of 10 watts maximum heat load per coil from the gamma-ray sources. Also, a detailed biological-dose survey was performed which included: (a) the dose equivalent inside and outside the building, (b) the dose equivalent from the two mazes of the building, and (c) the skyshine contribution to the dose equivalent.

34923 **(CONF-830406—51) Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design.** Jung, J.; Abdou, M. (Argonne National Lab., IL (USA)). Mar 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE83011694.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

This paper presents assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design. The assessment of breeding requirement is described based on two design considerations; i.e.: (1) tritium inventory and doubling requirement; and (2) computational uncertainties associated with the breeding calculation. The lithium-containing materials considered include: solid Li_2O and $LiAlO_2$ and liquid lithium and 17 Li-83Pb.

34924 **(CONF-830406—Absts.) Fifth topical meeting on the technology of fusion energy.** (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 566p. NTIS, PC A24/MF A01. Order Number DE83004943.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

Abstracts are presented of the approximately 250 papers that were presented at the conference. Some of the main topics included the following: (1) next-generation devices, (2) tritium, (3) hybrids, (4) alternate fuels, (5) materials engineering, (6) blanket and first wall engineering, and (7) inertial confinement. (MOW)

34925 **(DOE/ET/52040—T8) SSBAPAC user manual.** Galambos, J.; Miley, G.H.; Choi, C.K. (Illinois Univ., Urbana (USA). Fusion Studies Lab.). Jan 1983. Contract AC02-76ET52040. 15p. (COO—2218-269). NTIS, PC A02/MF A01. Order Number DE83012318.

Portions are illegible in microfiche products.

SSBAPAC (Steady-State Burn Analysis PACage) is a computer code that evaluates the steady-state plasma performance (in terms of macroscopic quantities such as ignition requirements and specific fusion power density) for D-based fuel cycles, using a O-D Hot-Ion-Mode model. Included in the analysis is a calculation of the steady-state superthermal distribution functions with options for the inclusion of NES and/or fusion-in-flight of the fusion products and NES recoils. The integrated quantities (such as slowing down power on the ions) from the steady-state distributions are used in the HIM analysis to find the maximum allowable ratio of ion to electron temperature allowable for ignition (T/sub i//T/sub e/), and the associated plasma parameters such as ignition requirements (n/sub e/tau/sub e//sub ig/), and fusion power. There is also an option for including modifications to the ion-electron equilibration power due to magnetic field effects.

34926 **(GA-A—16890) Structured multi-stream command language.** Glad, A.S. (GA Technologies, Inc., San Diego, CA (USA)). Dec 1982. Contract AT03-76ET51011. 18p. NTIS, PC A02/MF A01. Order Number DE83011883.

A multi-stream command language was implemented to provide the sequential and decision-making operations necessary to run the neutral-beam ion sources connected to the Doublet III tokamak fusion device. A multi-stream command language was implemented in Pascal on a Classic 7870 running under MAX IV. The purpose of this paper is threefold. First, to provide a brief description of the programs comprising the command language including the operating system interaction. Second, to give a description of the language syntax and commands necessary to develop a procedure stream. Third, to provide a description of the normal operating procedures for executing either the sequential or interactive streams.

34927 **(IPP—1/206) Remotely handled vacuum flange connections.** Andelfinger, C.; Ulrich, M.; Weber, G. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). Apr 1982. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750054.

Reprint of ZEPHYR-report no. 33 of August 1980.

During the design of ZEPHYR, a fusion experiment for ignition and burn control, remotely handled high vacuum flanges were developed. The main features are: The tightening forces are transmitted via conically shaped flanges by a clamping chain, specially formed for small friction; the clamping forces are produced by one or two screws to minimize the positioning of remotely controlled manipulators; The arrangement is such that the flanges become completely free for axial removal, combined with exact axial alignment; the sealing areas are deepened so that scratching is avoided; the flange connection is suitable for elastomer and aluminium seals in a temperature range of 80 to 430 K. Up to now flanges with inner diameter of 100 to 650 mm have been successfully tested, larger flanges are under preparation.

34928 **(LA-UR—83-999) Circuit model for the explosive-driven plate generator.** Caird, R.S.; Erickson, D.J.; Fowler, C.M.; Freeman, B.L.; Goforth, J.H. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 31p. (CONF-830606—6). NTIS, PC A03/MF A01. Order Number DE83011110.

From 3. international conference on magagauss magnetic field generation and related topics; Novosibirsk, USSR (13 Jun 1983).

It is useful to model explosive-driven generators as lumped-parameter circuit elements in order to estimate performance in new applications and to optimize the design of experiments. The plate generator is essentially a parallel or tilted-plate transmission line in which the current-carrying flat-plate conductors are driven by plane-wave explosive systems. We have developed a simple model for the time-varying inductance of this system. First, an analytic expression is used to predict the plate motion. Then, the inductance is expressed as a function of plate separation to give the computational model. Time-dependent flux losses are accounted for by an increasing waste inductance. Model predictions are compared with the available shot data.

34929 **(LA-UR—83-1087) Instability localized at the inner surface of an imploding spherical shell.** Han, S.J. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 16p. (CONF-830463—1). NTIS, PC A02/MF A01. Order Number DE83011167.

From American Physical Society spring meeting; Balitmore, MD, USA (18 Apr 1983).

It is shown that in an imploding spherical shell the surface instabilities are of two different types. The first, which occurs at the outer surfaces, is the Rayleigh-Taylor instability. The second instability occurs at the inner surface. This latter instability is not as disruptive as R-T modes, but it has three basic properties which differ considerably from those of the R-T instability: (1) it is oscillatory at early times; (2) it grows faster in the long wavelength modes; (3) it depends on the equation of state. It is further shown that this new instability is driven by amplified sound waves in the shell.

34930 **(LA-UR—83-1152) Copper alloy irradiations studies in support of CRFPR first wall.** Clinard, F.W. Jr. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 7p. (CONF-830466—1). NTIS, PC A02/MF A01. Order Number DE83011140.

From DOE workshop on copper alloys; Washington, DC, USA (14 Apr 1983).

34931 **(LA-UR—83-1175) Modeling and analysis of inertial-confinement-fusion facilities.** Bohachevsky, I.O.; Peaslee, A.T. Jr. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 22p. (CONF-830632—1). NTIS, PC A02/MF A01. Order Number DE83011147.

From 3. international conference on emerging nuclear energy systems; Helsinki, Finland (6 Jun 1983).

Portions are illegible in microfiche products.

Approximate analytic models are used to explore relations among technical and economic characteristics of Inertial Confinement Fusion (ICF) facilities. Presented are attainable pulse rates for different reactor cavities and dependencies of the unit production cost of electricity on ICF driver pulse energy and repetition rate and on the facility size and the performance of the driver-pellet combination. The results indicate that economic electricity production with ICF reactors may require repetition rates of $\sim$ 15 Hz or 20 Hz but that it may be achieved with values of the driver efficiency-pellet gain product as low as $\sim$ 3 or 4.

34932 **(MPQ—67) Simple mechanism for the release of laser targets.** Foelsner, W.; Haas, H.; Sigel, R. (Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.)). Oct 1982. 7p. Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.).

A simple mechanism for the release of laser targets is described. The target is placed on a flexible support (stell ribbon) and adjusted into the focus of the laser beam. The support is then hit by the snapper of a rat trap. As snapper and support move downward at a velocity of proportional 20 ms^{-1} the target is left on position owing to its inertia. After proportional 2 ms, i.e. before appreciable motion due to the onset of free fall has occurred, the target is hit by the laser pulse. The apparatus has been successfully tested in proportional 100 target shots with the Asterix III iodine laser using solid spherical targets of steel, glass and vanadium with diameters greater than 100 μm and recently also with hollow glass microballoons of 200 μm and 80 μm diameter.

34933 **(ORNL/CSD/TM—198) Programmer's guide to FFE: a fast front-end data-acquisition program.** Million, D.L. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 39p. NTIS, PC E03/MF A01. Order Number DE83012134.

Includes 1 sheet of 24x reduction microfiche.

The Large Coil Test Facility project of the Fusion Energy Division has a data acquisition system which includes a large host computer and several small, peripheral front-end computers. The front-end processors handle details of data acquisition under the control of the host and pass data back to the host for storage. Some of the front ends are known as fast front ends and are required to collect a maximum of 64,000 samples each second. This speed and other hardware constraints resulted in a need for a stand-alone, assembly language task which could be downline loaded from the host system into the fast front ends. FFE (Fast Front End) was written to satisfy this need. It was written in the PDP-11 MACRO-11 assembly language for an LSI-11/23 processor. After the host loads the task into the front end, it controls the data acquisition process with a series of commands and parameters. This Programmer's Guide describes the structure and operation of FFE in detail from a programming point of view. A companion User's guide provides more information on the use of the program from the host system.

34934 **(PPPL—1994) Implications of polarized DT plasmas for toroidal fusion reactors.** Micklich, B.J.; Jassby, D.L. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1983. Contract AC02-76CH03073. 26p. NTIS, PC A03/MF A01. Order Number DE83012427.

Spin polarization of the deuterons and tritons in a reacting plasma can result in an increase in the fusion reactivity and variation of the angular distribution of emission of the fusion neutrons. The increased fusion reactivity relaxes the confinement-temperature conditions for breakeven and ignition. We have determined the effect of varying the angular distribution of the fusion neutrons on the spatial distribution of fusion neturon current and flux at the first wall, on the global tritium breeding ratio, and on the first-wall radiation damage in low-aspect-ratio toroidal geometry.

34935 **(PPPL—1997) Environmental monitoring report for calendar year 1982.** Stencel, J.R. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1983. Contract AC02-76CH03073. 53p. NTIS, PC A04/MF A01. Order Number DE83012424.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The results of the environmental monitoring program for CY82 for the Princeton Plasma Physics Laboratory (PPPL) are presented and discussed. Since this is PPPL's first official annual report and programs are in initial phases, a part of the report deals with program expansion for the coming years. A phased approach has been planned to assure the proper level of monitoring to coincide with the Tokamak Fusion Test Reactor (TFTR) program.

34936 **(PPPL—2000) Resonant-cavity ICRF coupler for large tokamaks.** Perkins, F.W.; Kluge, R.F. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1983. Contract AC02-76CH03073. 45p. NTIS, PC A03/MF A01. Order Number DE83012429.

A new resonant-cavity ICRF coupler is proposed for large tokamaks. The design features a novel resonant cavity, an rf magnetic-field orientation that effectively radiates fast Alfven waves, matching to 40 Ω transmission lines, and an electric-field orientation so that the strongest rf electric fields are orthogonal to the main toroidal magnetic field thereby benefitting from magnetic insulation. As a result, the power handling capability is excellent. For the case of the Big-Dee Doublet III tokamak, a single 35 cm x 50 cm coupler can launch 20 MW of fast Alfven waves. Extrapolation to fusion reactor parameters is straightforward.

34937 **(PPPL—2004) Axisymmetric scrape-off plasma transport.** Singer, C.E.; Langer, W.D. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1983. Contract AC02-76CH03073. 21p. NTIS, PC A02/MF A01. Order Number DE83012433.

The two-dimensional flow of a collision dominated hydrogen scrape-off plasma in an axisymmetric tokamak is examined. This flow is described by a set of equations which contain the dominant terms in a maximal ordering appropriate to high density experimental divertors and reactor scrape-off plasmas. Comparison of the theory to estimates of scrape-off parameters in the Doublet III expanded boundary plasmas suggests that analysis of classical and neoclassical processes alone may be sufficient to predict plasma transport in high density scrape-off plasmas of practical importance.

34938 **(SAI—254-83-438-LJ) Magnetic-coil optimization for quadrupole-stabilized mirror systems.** D'Ippolito, D.A.; Francis, G.L.; Myra, J.R. (Science Applications, Inc., Boulder, CO (USA)). Apr 1983. Contract AC03-76ET53057. 27p. NTIS, PC A03/MF A01. Order Number DE83012362.

A numerical technique is presented to optimize the design of quadrupole magnetic coil systems, such as presently used in tandem mirror fusion experiments. The optimization is carried out with respect to various plasma physics properties (e.g. MHD stability and reduced radial transport of particles) which depend on the magnetic field geometry. The coils are treated as filaments of infinitesimal thickness and the magnetic field is computed in the paraxial limit. Constraints on the coil shape and on the magnetic geometry can be incorporated into the method. It is demonstrated that coil solutions can be found which match given paraxial field profiles or which directly minimize a scalar functional of these profiles. As an interesting application of the latter technique, a filamentary coil design for a nearly omnigenous anchor is obtained.

34939 **(SAND—83-0663C) Current status of calculations and measurements of ion stopping power in ICF plasmas.** Mehlhorn, T.A.; Peek, J.M.; McGuire, E.J.; Olsen, J.N.; Young, F.C. (Sandia National Labs., Albuquerque, NM (USA); Naval Research Lab., Washington, DC (USA)). 1983. Contract AC04-76DP00789. 54p. (CONF-830354—1). NTIS, PC A04/MF A01. Order Number DE83011448.

From International workshop on atomic physics for ion driven fusion; Paris, France (21 Mar 1983).

More-precise stopping-power models for use in ICF target design need to be developed. The ion-driven ICF program is now moving into a phase where ad hoc scaling of certain key physics parameters in the stopping-power models is no longer sufficient. Our goal is to predict ion ranges in ICF targets to within about 10%. A verified stopping-power model is also essential in diagnosing target-irradiation intensities; such data can only be inferred by target response. Presently, our area of primary concern involves calculating the stopping power of the bound electrons of partially ionized atoms. One bound-electron stopping-power model that we are investigating uses the free-electron-gas model along with Hartree-Fock-Slater atomic charge-density profiles to calculate I(Z,q,E), a generalized average ionization potential for the target electrons. This method is being systematically studied to look for deficiencies in the underlying physics model, especially at low projectile velocities. Another procedure uses the Generalized Oscillator Strength model to calculate the bound-electron stopping. Experimental measurements of enhanced stopping power in ICF plasmas at the .3 TW/cm^2 level have been reported by the Naval Research Laboratories. Further experiments at Sandia are aimed at extending this data base both to higher ionization states and to higher-Z targets using a 1.2 TW/cm^2 proton beam on the PROTO-I accelerator.

34940 **(UCID—18865-Vol.1) Advanced Lasers Program. Program/contracting plan.** (Lawrence Livermore National Lab., CA (USA)). Dec 1980. Contract W-7405-ENG-48. 81p. NTIS, PC A05/MF A01. Order Number DE83011787.

Portions are illegible in microfiche products.

To assess the scalability of the short wavelength laser driver in the FY85-86 time frame, a program has been developed to critically assess promising advanced laser candidates for use as a potential driver in the HGFT. The elements of this activity are the baseline rare-gas-halogen pulse compressor and advanced laser concepts programs. The major goal of the baseline activity is the construction, test and evaluation of a subscale fully integrated System Test Bed (STB) at a nominal energy of 10 kJ. In addition the advanced laser concepts program is structured to develop new concepts that

are technically superior to the baseline activity. This program plan could be completed in five years at a resource expenditure of approximately $15M per year with the majority of these funds being spent in industry. Most resources are committed to the baseline-pulse compressor program.

34941 **(UCID—18865-Vol.2) Advanced lasers program: National Laboratory programs.** (Lawrence Livermore National Lab., CA (USA)). Dec 1980. Contract W-7405-ENG-48. 61p. NTIS, PC A04/MF A01. Order Number DE83011786.

Portions are illegible in microfiche products.

A review of the programs at the LLL, LASL, and Sandia National Laboratories is given. Laser and materials studies are described in particular. (MOW)

34942 **(UCID—18865-Vol.3) Advanced Lasers Program: advanced laser concepts. Technical summary.** (Lawrence Livermore National Lab., CA (USA)). Dec 1980. Contract W-7405-ENG-48. 236p. NTIS, PC A11/MF A01. Order Number DE83011785.

Portions are illegible in microfiche products.

This report is given in terms of the following: (1) advanced laser requirements and concepts, (2) RGH stacker/compressor laser systems, and (3) advanced laser concepts. (MOW)

34943 **(UCRL—50021-81) 1981 laser program annual report.** (Lawrence Livermore National Lab., CA (USA)). Aug 1982. Contract W-7405-ENG-48. 598p. NTIS, PC A25/MF A01. Order Number DE83011875.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report is published in sections that correspond to the division of technical activity in the Program. Section 1 provides a Program Overview, presenting highlights of the technical accomplishments of the elements of the Program, a summary of activities carried out under the Glass Laser Experiments Lead Laboratory Program, as well as discussions of Program resources and facilities. Section 2 covers the work on solid-state Nd:glass lasers, including systems operations and Nova and Novette systems development. Section 3 reports on target-design activities, plasma theory and simulation, code development, and atomic theory. Section 4 presents the accomplishments of the Target Fabrication group, Section 5 contains the results of our diagnostics development, and Section 6 reports the results of laser-target experiments conducted during the year, along with supporting research and development activities. Section 7 presents the results from laser research and development, including solid-state R & D and the theoretical and experimental research on advanced lasers. Section 8 contains the results of studies in areas of energy and military applications, including those relating to electrical energy production by inertial-confinement fusion systems.

34944 **(UCRL—50051-82-3) Mirror fusion. Quarterly report, July-September 1982.** Harrison, M.A.; Gerich, C.A. (eds.). (Lawrence Livermore National Lab., CA (USA)). 10 Dec 1982. Contract W-7405-ENG-48. 52p. NTIS, PC A04/MF A01. Order Number DE83012343.

In the Mirror Fusion Quarterly Report, we summarize current activities in the Magnetic Fusion Energy program at Lawrence Livermore National Laboratory (LLNL). In a given Quarterly, not all MFE projects are necessarily represented, and details are kept to a minimum. Readers wanting more information are encouraged to read referenced documents or to contact the individuals engaged in the projects. The main sections of this report are: (1) Magnetic-Mirror Systems Experiments; (2) Mirror Fusion Test Facility; (3) Applied Plasma Physics (Theory); and (4) Development and Technology.

34945 **(UCRL—53333) Mirror Advanced Reactor Study interim design report.** (Lawrence Livermore National Lab., CA (USA)). Apr 1983. Contract W-7405-ENG-48. 562p. NTIS, PC A24/MF A01. Order Number DE83011865.

The status of the design of a tenth-of-a-kind commercial tandem-mirror fusion reactor is described at the midpoint of a two-year study. When completed, the design is to serve as a strategic goal for the mirror fusion program. The main objectives of the Mirror Advanced Reactor Study (MARS) are: (1) to design an attractive tandem-mirror fusion reactor producing electricity and synfuels (in alternate versions), (2) to identify key development and technology needs, and (3) to exploit the potential of fusion for safety, low activation, and simple disposal of radioactive waste. In the first year we have emphasized physics and engineering of the central cell and physics of the end cell. Design optimization and trade studies are continuing, and we expect additional modifications in the end cells to further improve the performance of the final design.

34946 **(UCRL—53384) Technology demonstration report for the Mirror Fusion Test Facility (MFTF-B).** Forsberg, H.C. (ed.). (Lawrence Livermore National Lab., CA (USA)). 20 Dec 1982. Contract W-7405-ENG-48. 49p. NTIS, PC A03/MF A01. Order Number DE83012730.

This report describes the activities of the Mirror Fusion Test Facility (MFTF) Technology Demonstration Program during January and February 1982. It also documents the systems test, which verified all major technology and design objectives of the superconducting ying-yang magnet, vessel, and external vacuum, cryogenic, local control, instrumentation, and supervisory control and diagnostic systems. Because of this program, work on the design and construction of the tandem version of MFTF-B (axicell) is now proceeding with much greater design confidence and lower risks.

34947 **(UCRL—88211) Influence of steel type on the activation and decay of fusion-reactor first walls.** Blink, J.A.; Lasche, G.P. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 17p. (CONF-830406—53). NTIS, PC A02/MF A01. Order Number DE83010819.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Five steels (PCA, HT-9, thermally stabilized 2.25 Cr-1 Mo, Nb stabilized 2.25 Cr-1 Mo, and 2.25 Cr-1 V) are compared as a function of time from the viewpoints of activation, afterheat, inhalation biological hazard potential (bhp), ingestion bhp, and feasibility of disposal by shallow land burial. An additional case uses the 2.25 Cr-1 V steel with a metal wall (LMW) protective shield between the neutron source and the wall. (This geometry is feasible for inertial confinement fusion reactors.) The PCA steel is the worst choice and the LMW protected 2.25 Cr-1 V is the best choice by substantial margins from all five viewpoints. The HT-9 and two versions of 2.25 Cr-1 Mo are roughly the same at intermediate values. The 2.25 Cr-1 V has about the same afterheat as those three steels, but its waste disposal feasibility is considerably better. Under NRC's proposed low level waste disposal rule (10CFR61), only the 2.25 Cr-1 V could be considered low level waste suitable for shallow land burial.

34948 **(UCRL—88215) Design considerations for direct-illumination-driven inertial-fusion reactors.** Hovingh, J. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 15p. (CONF-830406—52). NTIS, PC A02/MF A01. Order Number DE83010928.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

This study parametrically examines the implications on inertial-fusion-reactor design of the use of direct-drive pellets as an alternative to the radiation-driven targets. We have examined the impacts of direct illumination on mirror damage constraints, reactor neutronic performance, and system energetics and cost. The capital costs for low f/number, direct-illumination-driven inertial-fusion power plants are required to be significantly less than those for the radiation-driven or high f/number direct-illumination-driven power plants to produce electricity at the same cost.

34949 (UCRL—88232) Fusion-breeder-reactor design studies. Moir, R.W.; Lee, J.D.; Coops, M.S. (Lawrence Livermore National Lab., CA (USA); TRW Systems, Redondo Beach, CA (USA); GA Technologies, Inc., San Diego, CA (USA); Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Reactors Div.; Oak Ridge National Lab., TN (USA); Idaho National Engineering Lab., Idaho Falls (USA); Energy Technology Engineering Center, Canoga Park, CA (USA)). 5 Apr 1983. Contract W-7405-ENG-48. 11p. (CONF-830406—39). NTIS, PC A02/MF A01. Order Number DE83012104.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

Studies of the technical and economic feasibility of producing fissile fuel in tandem mirrors and in tokamaks for use in fission reactors are presented. Fission-suppressed fusion breeders promise unusually good safety features and can provide make-up fuel for 11 to 18 LWRs of equal nuclear power depending on the fuel cycle. The increased revenues from sales of both electricity and fissile material might allow the commercial application of fusion technology significantly earlier than would be possible with electricity production from fusion alone. Fast-fission designs might allow a fusion reactor with a smaller fusion power and lower Q value to be economical and thus make this application of fusion even earlier. A demonstration reactor with a fusion power of 400 MW could produce 600 kg of fissile material per year at a capacity factor of 50%. The critical issues, for which small scale experiments are either being carried out or planned, are: (1) material compatibility, (2) beryllium feasibility, (3) MHD effects, and (4) pyrochemical reprocessing.

34950 (UCRL—88704) Projectile-power-compressed magnetic-field pulse generator. Barlett, R.H.; Takemori, H.T.; Chase, J.B. (Lawrence Livermore National Lab., CA (USA)). 17 Mar 1983. Contract W-7405-ENG-48. 17p. (CONF-830606—7). NTIS, PC A02/MF A01. Order Number DE83012111.

From 3. international conference on magagauss magnetic field generation and related topics; Novosibirsk, USSR (13 Jun 1983).

Design considerations and experimental results are presented of a compressed magnetic field pulsed energy source. A 100-mm-diameter, gun-fired projectile of ~ 2MJ kinetic energy was the input energy source. An initial magnetic field was trapped and compressed by the projectile. With a shorted load, a magajoule in a nanohenry was the design goal, i.e., 50 percent energy transformation from kinetic to magnetic. Five percent conversion was the highest recorded before gauge failure.

99 GENERAL AND MISCELLANEOUS

34951 (INIS-mf—7475-Vol.A) Proceedings of the Second Brazilian Congress of Energy. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia; Clube de Engenharia, Rio de Janeiro (Brazil)). 1981. 443p. (In Portuguese). (CONF-8104136—Vol.A). NTIS (US Sales Only), PC A19/MF A01. Order Number DE83780432.

From 2. Brazilian energy congress; Rio de Janeiro, Brazil (6 Apr 1981).

A separate abstract was prepared for each item in scope for the Energy Data Base. (HDR)

9901 Management

REFER ALSO TO CITATION(S) 34476

34952 (DOE/ER—0127/1) Doctoral scientists and engineers working in energy-related activities, 1981. (Oak Ridge Associated Universities, Inc., TN (USA)). Apr 1983. Contract AC05-76OR00033. 61p. NTIS, PC A04/MF A01. Order Number DE83011812.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Department of Energy has a responsibility to help ensure the supply of highly trained personnel by providing supply and demand information on energy-related manpower to public and private planners and the general public. This report provides information about the number and characteristics of doctoral-level engineers and scientists working primarily in energy-related activities. The data for the year 1981 are part of the information base for a program of continuing studies of the employment and utilization of all scientists and engineers involved in energy-related activities. Information from these studies will provide input to consideration of actions necessary to ensure that adequate numbers of qualified scientists and engineers are available, when needed, to develop the nation's energy resources and technologies.

34953 (DOE/NBM—3012245) Report of the Energy Research Advisory Board on the relationship between the University of California and the Los Alamos Scientific and the Lawrence Livermore Laboratories. (USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board). May 1979. 26p. NTIS, PC A03/MF A01. Order Number DE83012245.

On December 29, 1978, Secretary James R. Schlesinger wrote to the chairman of the Energy Research Advisory Board (ERAB) requesting that the ERAB review the relationships between the University of California and the two nuclear weapons laboratories which the University administers for the government (and that) the ERAB ... recommend how these relationships should evolve to best serve the needs of the nation and the laboratories. This report is in response to the Secretary's request.

34954 (KFK—3297) Results of research and development work 1981 of the Institute of Nuclear Engineering. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernverfahrenstechnik). Mar 1982. 13p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750110.

Besides the works for the demonstration plant in Brazil, separation nozzle methods for commercial plants are tried that allow an economical way of enriching uranium in plants of medium capacity. An injection method has been developed by means of which space-charge problems while producing intensive hydrogen rays for fusion experiments and fusion reactors allow can be disarmed. The interaction of He3-, He-4- and H_3-cluster rays with nuclear- and electron rays has been investigated as part of the basic research.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 33188, 33224, 33241, 33242, 33251, 34102, 34168, 34252, 34672

34955 (ANL/MCS-TM—6) Toolpack Fio library installers' guide. Shafton, A.L.; Cowell, W.R.; Osterweil, L.J. (Colorado Univ., Boulder (USA). Dept. of Computer Science; Argonne National Lab., IL (USA)). 16 Feb 1983. Contract W-31-109-ENG-38;AC02-80ER10718. 27p. NTIS, PC A03/MF A01. Order Number DE83011948.

In the Toolpack programming environment [Osterweil, 1982] the Fortran subject programs, documentation, analyzer reports, tool option specifications, and other data associated with program development and analysis reside in a tree-structured file system based on [Hanson, 1980]. The user invokes tools in a command language that permits him or her to refer to these files. The tools are embedded in the Toolpack Integration System for Tools (IST) through which they communicate with the file system and hence with the user and each other; in particular, the high-level tools, such as the data-flow analyzer, are composed from interdependent tool fragments that take input from and place output in the file system. This integrated environment appears functionally the same to the users of every host system on which it is installed so that the community of Fortran programmers may have a common development environment as well as a common programming language. The strategy of the Toolpack group at the University of Colorado to achieve transportability of the environment includes (1) the construction of the Fio library that implements a portbuffered input/output system, (2) the use of Ratfor to produce the Toolpack system software, and (3) the

use of macro processors to expand archival code. The Fio library permits the realization of the Toolpack file system, using host system files as raw material. It includes input/output routines and routines to perform such character manipulation functions as character packing and unpacking, character set conversion, and character to integer conversion. Efficiency and various host-system-specific considerations dictate that the routines in a subset of the Fio library are candidates for recoding by the installer. A large part of this installers' guide is concerned with this task.

34956 **(DOE/MC/16505—T1) Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983.** Moore, L.T. (West Virginia Univ., Morgantown (USA). Dept. of Industrial Engineering). 1983. Contract AT21-81MC16505. 10p. NTIS, PC A02/MF A01. Order Number DE83012244.

This final report concludes the project dealing with risk analysis techniques and related data bases. The bulk of the reporting on the project was contained in the Technical Report of December, 1983, but this report contains a more-extensive description of the use of the FRANTIC II computer program. The FRANTIC (Formal Reliability Analysis including Normal Testing, Inspection, and Checking Program) is a FORTRAN Computer Code which computes the average and time-dependent unavailability of any general system model such as a fault tree or event tree, incorporating in detail the effects of different periodic testing schemes. The program can be used to assess the effects on system unavailability of test downtimes, repair times, test efficiency, test bypass capabilities, test-caused failures, and different test staggerings. In addition to periodically tested components, non-repairable and monitored components can be modeled as can human error and common causes of failures. The FRANTIC-II Code incorporates the use of the Weibull distribution, which has a time-dependent failure rate.

34957 **(DP-MS—82-101) Security and risk analysis at Savannah River.** Flanders, K.L. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1982. Contract AC09-76SR00001. 9p. (CONF-821126—3). NTIS, PC A02/MF A01. Order Number DE83011244.

From 5. DOE computer security conference; Knoxville, TN, USA (16 Nov 1982).

This presentation provides a detailed report on the methodology used during the risk analysis of the Central Computer Facility at Savannah River. This paper describes the data collection process, the simulation model, and the program used in the analysis. Cost information on the analysis is included; however, results of the analysis are omitted due to their sensitivity. Risk analysis is used at Savannah River to consolidate security studies into a well-defined process that produces a quantative assessment of our computer operation. The results of the analysis points out areas of high risk, allowing security efforts to be concentrated for greatest benefit. Security measures to reduce the risk of operations of the Savannah River Central Computer Facility have already been adopted or are under study.

34958 **(KFK—3306) Results of research and development works 1981 of the Institute of Data Processing in the Field of Engineering.** (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik). Feb 1982. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750109.

The hardware of the 1st stage of the safety computer system MIRA has been designed for KNKII. The data aquisition- and analysis system of the TESPE test plant has been completed by a module for rapid aquisition of data from analog tapes. The communication control of a working place computer and several program modules for evaluation of analyses and for the exchange of data for the distributed DP-system for automation of the plant laboratory of the WAK have been finished. Model calculations on the in-situ final storage of MAW/LAW and on the failure behaviour of the resolver exhaust gas cleaning of the PASSAT plant have been carried out, and the DP-system KANIS in the SNEAK has been put into operation.

34959 **(LA-UR—83-1201) Dynamic acceleration of nonlinear iterations.** Hyman, J.M.; Manteuffel, T.A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 13p. (CONF-830352—1). NTIS, PC A02/MF A01. Order Number DE83011149.

From Conference on elliptic boundary value problems; Monterey, CA, USA (1 Mar 1983).

Many large and complicated production codes require iteration to the solution of a system of nonlinear equations. For example, the solution to a time-dependent partial differential equation may require the solution of a nonlinear system at each time step. Unfortunately, these codes often implement suboptimal methods and convergence is very slow.

34960 **(LA-UR—83-1226) High-performance computing at Los Alamos.** Ewald, R.H. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 8p. (CONF-830461—1). NTIS, PC A02/MF A01. Order Number DE83011180.

From SHARE European Association spring meeting; Noordwijkerhout, Netherlands (25 Apr 1983).

The Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy (DOE). The Laboratory employs about 7000 people, and its mission is to perform research and development activities related to national security and energy programs. To support its own and other national programs, the Laboratory has developed a state-of-the-art scientific computing network that supports about 4500 users. The network, called the Integrated Computing Network (ICN), is shown. About 100 computers are connected to the ICN, and it is separated physically or logically into three security partitions: Secure for classified computing; Open for unclassified computing; and Administrative for administrative computing. The networks are described and some data on system performance and workload characterization are given.

34961 **(LA-UR—83-1275) Distributed processors and intelligent workstations at Los Alamos.** Buzbee, B.; Slocomb, C. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 13p. (CONF-830531—2). NTIS, PC A02/MF A01. Order Number DE83011294.

From International conference on tools, methods, and languages for scientific and engineering computation; Paris, France (17 May 1983).

The Los Alamos National Laboratory is known for its interest in large-scale and scientific computation. However, since 1978, the Laboratory has developed distributed processing and is now developing a framework for support of microprocessor-based intelligent workstations. As practiced at Los Alamos, distributed processing means the distribution of minicomputers across a relatively large geographical area and the integration of them into a single network. Discussed in this paper are the motivations for the network, the communications technology used, some salient implementation factors, and advantages and disadvantages of distributed processing. Also discussed are the motivations for intelligent workstations, our categorization of workstations, the goals for each category, implementation plans, and some critical issues associated with them.

34962 **(LBL—15651) Limited-angle problem in tomography and some related mathematical problems.** Gruenbaum, F.A. (Lawrence Berkeley Lab., CA (USA)). May 1982. Contract AC03-76SF00098. 14p. (CONF-8205184—1). NTIS, PC A02/MF A01. Order Number DE83011672.

From International colloquium of mathematics in the natural sciences; Luminy, France (1 May 1982).

Consider the problem of recovering a compactly supported function f(x), x ϵ R/sup n/, from a collection of its one dimensional projections give by Pf(w,t) = integral of f from (x,w) = t w ϵ S/sup n-1/. Here S/sup n-1/ denotes the unit sphere in R/sup n/, and (x,w) denotes the usual inner product of R/sup n/. The most common applications call for n = 2 (X-ray tomography) or n = 3 (Nuclear Magnetic Resonance Imaging) and therefore we will occasionally specialize our considerations to these cases. One of the main concerns in this lecture is the effect that a limitation of the

range over which the directions w can be chosen has on the quality of the reconstruction.

34963 **(N—8231507) Clock error models for simulation and estimation.** Meditch, J.S. (Aerospace Corp., El Segundo, CA (USA)). Oct 1981. 64p. NTIS, PC A04/MF A01.

Mathematical models for the simulation and estimation of errors in precision oscillators used as time references in satellite navigation systems are developed. The results, based on all currently known oscillator error sources, are directly implementable on a digital computer. The simulation formulation is sufficiently flexible to allow for the inclusion or exclusion of individual error sources as desired. The estimation algorithms, following from Kalman filter theory, provide directly for the error analysis of clock errors in both filtering and prediction.

34964 **(ORNL—5723) PRP-4: an updated version of the discounted-cash-flow program PRP.** Salmon, R. (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 62p. NTIS, PC A04/MF A01. Order Number DE83012525.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A previous report described the computer program PRP, which can be used to calculate the production cost (product price) of a product from a process plant when the investments, expenses, interest rates, rate of return on equity, and similar related data are specified. Conversely, if the product price is given in advance, the program can be used to calculate the annual rate of return on equity. The program uses the discounted cash flow procedure in a trial-and-error mode and generates a table showing the annual cash flow history of the project. The purpose of the present report is to bring users of PRP up to date on the current version of the program, which is designated PRP-4. During the period 1977 to 1981, four new options were added to the program to increase its utility: (1) use of escalation or inflation rates for costs and product prices, (2) debt retirement by constant annual principal reduction, (3) use of product price ratios when a plant produces several products, and (4) provision for user-inputted annual tax depreciation percentages. In addition, investment tax credits are now taken in the year of which the investment is made rather than in the year of plant startup.

34965 **(PTB-FMRB—89) Assembler routines for process-control using the microcomputers Commodore cbm 3032/4032/8032.** Lindemann, H.; Schuster, H.J. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Forschungs- und Messreaktor). Dec 1981. 62p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750097.

A software package is described that controls fast data transfer between personal computers of the Commodore series cbm 3032/4032/8032 and any measurement system which is adapted to the computer by a special measurement in-output interface. Each software module is called from the BASIC user program with user-defined parameters. Data may be buffered in the computers memory. The software is completely written in the assembler language for the microprocessor MCA 6502 and allows handshaked data transfer rates up to 50000 Bytes/s.

34966 **(SAND—83-0099C) Are most low-density knapsacks solvable in polynomial time.** Brickell, E.F. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 12p. (CONF-830228—1). NTIS, PC A02/MF A01. Order Number DE83010511.

From 14. southeastern conference on combinatorics, graph theory and computing; Boca Raton, FL, USA (14 Feb 1983).

In this paper, we show how techniques similar to those developed for breaking the cryptosystems can be used to solve knapsacks of low density. In the examples we have run, the algorithm has always been successful on knapsacks of density $\leqq 1/2$. We show, based on one assumption, that the algorithm will succeed on most knapsacks of density $\leqq 1/3$.

34967 **(UCID—19793) MEGA (Mechanical Engineering General Analysis) user's document.** Voegeli, B.; Wong, C.K. (Lawrence Livermore National Lab., CA (USA)). 16 Feb 1983. Contract W-7405-ENG-48. 64p. NTIS, PC A04/MF A01. Order Number DE83011936.

MEGA (Mechanical Engineering General Analysis) is a FORTRAN computer code, which allows the user to analyze data, generated by a variety of data acquisition systems currently being used by Engineering Sciences Division (DVM Node, Transient Recorder, Fracture Mechanics, etc.). This document describes the menu-drive, user-system interaction of MEGA.

34968 **(UCRL—53404) A2900 meta assembler user manual.** Maron, N. . (Lawrence Livermore National Lab., CA (USA)). 29 Mar 1983. Contract W-7405-ENG-48. 85p. NTIS, PC A05/MF A01. Order Number DE83011810.

This meta assembler package is a flexible development tool for programming bit-slice microprocessors such as the Advanced Micro Devices (AMD) 2900 series. It is much more flexible than conventional assemblers, since it has the capability to assemble code for word widths from 1 to 96 bits. On the other hand, it does not have various character processing commands, conditional assembly, and so on, that various other assemblers have as standard features. This meta assembler operates in three steps. The first step, called the definition phase, allows the programmer to define the bit width of the instructions to be programmed and various op codes that will be used in the second step, called the assembly phase. The assembly phase assembles the source code into an intermediate form suitable for the post-processor. During the assembly, the various op codes are converted into their binary representations. The third step, called the post-processing phase, is used to convert the bit-patterns output from the assembly phase into a file format suitable for making the punched tapes that can be used to program PROMs.

34969 **(UCRL—88558) Modeling and monitoring a LAN.** Watson, W.B. (Lawrence Livermore National Lab., CA (USA)). 18 Apr 1983. Contract W-7405-ENG-48. 23p. (CONF-830351—1). NTIS, PC A02/MF A01. Order Number DE83011230.

From Workshop on performance and evaluation of local area networks; Worcester, MA, USA (24 Mar 1983).

Clark, Program and Reed have suggested that the issues of local network design can be classified as either configuration issues or protocol issues. They visualize networks as consisting of four basic elements: the transmission medium, a control mechanism, the interfaces, and the protocols. Network performance is strongly dependent not only upon each of these elements but also upon their mutual interactions. The remainder of this paper consists of three sections. The first section deals with the validation of LLNL's discrete event simulation of the NSC Hyperchannel. The second section concerns the current state of traffic measurement in the Craynet. Lastly, the third section discusses the design and functionality of a Hyperchannel Monitoring Device (HMD).

34970 **Japanese supercomputer technology.** Buzbee, B.L.; Ewald, R.H.; Worlton, W.J. (Los Alamos National Lab., NM). *Science (Washington, D.C.);* **218**: 1189-1193(17 Dec 1982).

In February 1982, computer scientists from the Los Alamos National Laboratory and Lawrence Livermore National Laboratory visited several Japanese computer manufacturers. The purpose of these visits was to assess the state of the art of Japanese supercomputer technology and to advise Japanese computer vendors of the needs of the US Department of Energy (DOE) for more powerful supercomputers. The Japanese foresee a domestic need for large-scale computing capabilities for nuclear fusion, image analysis for the Earth Resources Satellite, meteorological forecast, electrical power system analysis (power flow, stability, optimization), structural and thermal analysis of satellites, and very large scale integrated circuit design and simulation. To meet this need, Japan has launched an ambitious program to advance supercomputer technology. This program is described.

34971 Complete guide to gamma variate generation. Tadikamalla, P.R. (Univ. of Pittsburgh, PA); Johnson, M.E. *American Journal of Mathematical and Management Sciences;* **1**: No. 3, 213-216(1982).

Considerable attention has recently been directed at developing simpler and faster algorithms for generating gamma random variates (with general, not necessarily integral, shape parameter α) on digital computers. This paper surveys the current state of the art, which includes fifteen gamma algorithms applicable for $\alpha \geq 1$ and six that are applicable for $\alpha < 1$. These algorithms are compared according to the criteria of speed and simplicity. General random variate generation techniques are explained with reference to these gamma algorithms. Computer simulation experiments on DEC and CDC computers are reported. Guidelines for some specific applications are given.

34972 Projection pursuit regression. Friedman, J.H.; Stuetzle, W. (Stanford Linear Accelerator Center, CA). *Journal of the American Statistical Association;* **76**: No. 376, 817-823(Dec 1981). Contract AC03-76SF00515.

A new method for nonparametric multiple regression is presented. The procedure models the regression surface as a sum of general smooth functions of linear combinations of the predictor variables in an iterative manner. It is more general than standard stepwise and stagewise regression procedures, does not require the definition of a metric in the predictor space, and lends itself to graphical interpretation.

34973 Adaptive Gaussian filtering and local frequency estimates using local curvature analysis. Hodson, E.K. (Los Alamos Scientific Lab., NM); Thayer, D.R.; Franklin, C. *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Acoustics, Speech and Signal Processing;* **29**: No. 4, 854-859(Aug 1981).

This paper presents an adaptive filtering technique for smoothing noisy sampled data. Due to the adaptive nature of the process, distortion of the information content is significantly reduced. Each point of the smoothed output is the result of a central convolution of the noisy data with a Gaussian. Gaussians of different width are used to produce each point of the smoothed output. The width of each Gaussian is selected, following local curvature estimates of the data, so that the smoothed points contain a nearly constant and acceptable error resulting from the smoothing process. Since each Gaussian has its half-power frequency equivalent, it is possible to infer the system of narrowest bandwidth that can be tolerated in transmitting the signal. The rationale used to determine the convolving Gaussians will be developed here along with brief discussions of applications.

34974 Testing unconstrained optimization software. More, J.J.; Garbow, B.S.; Hillstrom, K.E. (Argonne National Lab., IL). *ACM Transactions on Mathematical Software;* **7**: No. 1, 17-41(Mar 1981).

Much of the testing of otpimization software is inadequate because the number of test functions is small or the starting points are close to the solution. In additon, there has been too much emphasis on measuring the efficiency of the software and not enough on testing reliability and robustness. To address this need, a relatively large but easy-to-use collection of test functions has been developed and guidelines have been designed for testing the reliability and robustness of unconstrained optimization software.

34975 New implementation for the binary and minkowski operators. Young, I.T. (Lawrence Livermore National Lab., CA); Peverini, R.L.; Verbeek, P.W.; van Otterloo, P.J. *Computer Graphics and Image Processing;* **17**: 189-210(1981). Contract W-7405-ENG-48.

The binary and Minkowski operators are considered here to be the set of Boolean functions on binary pictures that perform the functions and, or not, exclusive-or, shrink, dilate, open, close and medial-axis transform. Through proper coding of the objects in a binary picture it is shown that these operators can be implemented in such a way as to decrease significantly computational complexity. The complexity is measured here as the number of primitive operations that must be executed on a picture of size N x N. A primitive operation is, or example, the algebraic comparison of two integer numbers. Except for pathological conditions, the implementation leads to complexities on the order of N; conventional implementations lead to complexities on the order of N^2.

34976 Explicit approximate solutions for S/sub B/. Bowman, K.O.; (Union Carbide Corp., Oak Ridge, TN); Serbin, C.A.; Shenton, L.R. *Communications in Statistics. Part B: Simulation and Computation;* **B10**: No. 1, 1-15(1981).

For the region in the (β_1, β_2) plane bounded by $\beta_1 = 0$, $\beta_2 - \beta_1 - 1 = 0$, $\beta_1 = 9$, and the lognormal line, approximate formulas for the fundamental parameters, γ and δ, are given in terms of β_1 and β_2. The solution can be completed using simple quadrature formulas for the scale and location parameters, λ and zeta. The formulas can be implemented on small programmable calculators with accuracy sufficient for most practical purposes.

34977 LU decomposition of M-matrices by elimination without pivoting. Funderlic, R.E. (Oak Ridge National Lab., TN); Plemmons, R.J. *Linear Algebra and Its Applications;* **41**: 99-110(1981).

It is shown that if A or - A is a singular M-matrix satisfying the generalized diagonal dominance condition y/sup T/A $\geq$ O for some vector y $\geq$ O, the A can be factored into A = LU by a certain elimination algorithm, where L is a lower triangular M-matrix with unit diagonal and U is an upper triangular M-matrix. The existence of LU decomposition of symmetric permutations of A and for irreducible M-matrices and symmetric M-matrices follow as corollaries. This work is motivated by applications to the solution of homogeneous systems of linear equations Ax = 0, where A or - A is an M-matrix. These applications arise, e.g., in the analysis of Markov chains, input-output economic models, and compartmental systems. A converse of the theorem mentioned above can be established by considering the reduced normal form of A.

34978 Moment series for the coefficient of variation in Weibull sampling. Bowman, K.O.; Shenton, L.R. pp 148-153 of 1981 Proceedings of the statistical computing section of the American Statistical Association. Washington, DC; American Statistical Association (1981). Contract W-7405-ENG-26.

For the 2-parameter Weibull distribution function $F(t) = 1 - \exp(-t/b)/\text{sup } c/$, $t > 0$ with c and b positive, a moment estimator c^* for c is the solution of the equation $\Gamma(1+2/c^*)/\Gamma^2(1+1/c^*) = 1 + v^{*2}$ where v^* is the coefficient of variation in the form $\sqrt{m_2}/m_1$ being the sample mean, m_2 the sample second central moment (it is trivial in the present context to replace m_2 by the variance). One approach to the moments of c^* (Bowman and Shenton, 1981) is to set-up moment series for the scale-free v^*. The series are apparently divergent and summation algorithms are essential; we consider methods due to Levin (1973) and one, (2cB), introduced ourselves (Bowman and Shenton, 1976).

9903 Information Handling

34979 Distributed resource management: deadlocks. Hayes, R.W. (Union Carbide Corp., Oak Ridge, TN). pp 669-673 of Proceedings of the Digital Equipment Computer Users Society. Los Angeles, CA; Digital Equipment Computer Users Society (1981). Contract W-7405-ENG-26.

Many applications require data base management without the need for an entire data base management system. Also, most simple locking mechanisms are not adequate for real-time data acquisition and control applications. This paper presents a basic resource management mechanism which acts as a traffic cop to control access to shared data bases in a real-time system. This mechanism makes use of a deadlock avoidance algorithm to resolve allocation conflicts. The concept of resource management is developed and the problem of system deadlocking is described. Alternatives to the deadlock problem are presented for real-time systems and a modified deadlock avoidance algorithm is developed to provide efficient allocation. This algorithm is implemented on an RSX-11M system and is designed for easy expansion to distributed systems. A basic approach to distributed resource management is also presented.

CORPORATE AUTHOR INDEX

In the Corporate Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings.

Each entry under a corporate heading gives the document title and the volume and abstract numbers. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes.

DOE Energy Information Data Base: Corporate Author Entries (DOE/TIC-4585) is used in the standardization of corporate entries. DOE/TIC-4585 is available for purchase from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, Virginia 22161.

A

Academia Sinica, Beijing (China). Inst. of High Energy Physics
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R;US)

Aerospace Corp., El Segundo, CA (USA)
Clock error models for simulation and estimation, 8:34963 (R;US)

Aerospace Systems, Inc., Burlington, MA (USA)
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R;US)

AeroVironment, Inc., Pasadena, CA (USA)
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R;US)

Aix-Marseille-3 Univ., 13 - Marseille (France)
New methods for preparing Cu_2S-CdS solar cell semiconductor materials. Final report, 8:33324 (R;XE;FR)

Alabama Univ., University (USA). School of Mines and Energy Development
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R;US)

Alliance to Save Energy, Washington, DC (USA)
Vanpooling for profit: a business opportunity, 8:33925 (R;US)

AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.
General and nuclear physics, 8:34793 (R;UA)
General and nuclear physics, 8:34763 (R;UA)

Argonne National Lab., IL (USA)
Advanced fuel-cell concepts for the 0.1- to 100-MW range, 8:33882 (R;US)
Argonne Tandem-Linac Accelerator System, 8:34307 (R;US)
Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R;US)
Charge state of sputtered impurity ions near a limiter or divertor in a tokamak, 8:34909 (R;US)
Comparison of testing methods for latent-heat-storage devices, 8:33548 (R;US)
Demonstration tokamak power plant, 8:34921 (R;US)
Development of on-line monitoring device to detect the presence/absence of sodium vapor, 8:33191 (R;US)
Dual-aperature dipole with 2nd harmonic, 8:34308 (R;US)
Dual-frequency ring-magnet power supply with flat bottom, 8:34306 (R;US)
EBT-P gamma-ray-shielding analysis, 8:34922 (R;US)
Effect of radiolysis on leachability of plutonium and americium from 76-101 glass, 8:34042 (R;US)
Effects of tritium contamination in the FED/INTOR reactor hall, 8:34916 (R;US)
Electromagnetic effects on the FED/INTOR limiter, 8:34920 (R;US)
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R;US)
Evaluation of options for freight carriers during a fuel crisis, 8:33924 (R;US)
Feasibility study of acoustic sensors for slurry-level measurements in coal-liquefaction systems, 8:32942 (R;US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R;US)
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R;US)
Hydrodynamics of adiabatic inverted annular flow: an experimental study, 8:33738 (R;US)
In pursuit of clean air: a data book of problems and strategies at the state level. 1982 update. Volume 3. Federal Regions V and VII, 8:33800 (R;US)
INTOR impurity control and first wall system, 8:34910 (R;US)
Lifetime analysis of fusion-reactor components, 8:34919 (R;US)
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R;US)
Measurement of crossflow forces on tubes, 8:33724 (R;US)
Measurement of the half-life of ^{60}Fe using the Argonne FN tandem-superconducting Linac system as an accelerator mass spectrometer, 8:34819 (R;US)
Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket, 8:34917 (R;US)
Non-stochastic effects of ^{226}Ra and ^{228}Ra in the human skeleton, 8:34585 (R;US)
Overview of first wall/blanket/shield technology, 8:34915 (R;US)
Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R;US)
Proceedings of the workshop on atomic physics with fast heavy-ion beams, 8:34707 (R;US)
Quasi-fission, 8:34835 (R;US)
Radon in homes and other technologically enhanced radioactivity, 8:34412 (R;US)
Relativistic many-body theory of atomic structures, 8:34720 (R;US)
Resonances in heavy systems, 8:34806 (R;US)
Seismic response of large suspended tanks, 8:33741 (R;US)
Stirling-engine thermodynamic analysis: a users guide to SEAM1, 8:34262 (R;US)
Superconducting accelerating structure for particle velocities from 0.12 to 0.23 c, 8:34264 (R;US)
Technology assessment of productive conservation in urban transportation. Final report, 8:33923 (R;US)
Theory and application of a three-dimensional code SHAPS to complex piping systems, 8:33740 (R;US)
There's more to erosion control than protecting the pipe, 8:33164 (R;US)
Time dependence of ground heat loss from solar ponds, 8:33538 (R;US)
Toolpack Fio library installers' guide, 8:34955 (R;US)
User's guide for the REBUS-3 fuel cycle analysis capability, 8:33701 (R;US)
Wall tritium contamination as a factor in fusion-reactor wall design, 8:34918 (R;US)

Army Electronics Research and Development Command, White Sands Missile Range, NM (USA). Atmospheric Sciences Lab.
Automatic meteorological station system AN/TMQ-30 ( ). Final report, 8:34393 (R;US)

Atomic Energy Board, Pelindaba, Pretoria (South Africa). Life Sciences Div.
Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra, 8:34511 (R;US)

Augsburg Univ. (Germany, F.R.). Inst. fuer Volkswirtschaftslehre
Interdependence between energy supply and the economy as a whole as an economic problem, 8:33851 (R;DE;In German)

Australian National Univ., Canberra. Inst. of Advanced Studies
Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach, 8:33654 (R;US)
AVRADCOM Research and Technology Labs., Cleveland, OH (USA)
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine, 8:33948 (R;US)

B

Barry (Theodore) and Associates, Los Angeles, CA (USA)
Review of energy-supply-decision issues in the US electric utility industry, 8:33867 (R;US)
Battelle Human Affairs Research Center, Seattle, WA (USA)
Near-term improvements for nuclear power plant control room annunciator systems, 8:33730 (R;US)
Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.)
Coke-Making 1990: World coke demand and coke overn capacity requirements in 1985 and 1990 with a view into the 1990s, 8:33096 (R;DE)
Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R;DE;In German)
Battelle Pacific Northwest Labs., Richland, WA (USA)
Near-term improvements for nuclear power plant control room annunciator systems, 8:33730 (R;US)
Bendix Corp., Kansas City, MO (USA)
Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R;US)
Component reliability as experienced by manufacturer of electronic assemblies, 8:34241 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA)
National Uranium Resource Evaluation: intermediate-grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado, 8:33176 (R;US)
Bentz (E.J.) and Associates, Inc., Springfield, VA (USA)
Characterization of foreign electric-utility experiences for potential useful applications in the US, 8:33621 (R;US)
Biphase Energy Systems, Santa Monica, CA (USA)
Development of the biphase turbine for waste-heat conservation. Final report, 8:33934 (R;US)
Black and Veatch Consulting Engineers, Kansas City, MO (USA)
Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R;US)
Boeing Co., Seattle, WA (USA)
Design Allowables Test program, Celion 3000/PMR-15 and Celion 6000/PMR-15, graphite/polyimide composites. Final Report, 8:34011 (R;US)
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Accuracy of track reconstruction with inhomogeneous magnetic detectors, 8:34851 (R;DE)
Diffraction scattering of strongly bound system, 8:34755 (R;DE)
Dynamic deuteron polarization measurements performed in a new type of horizontal dilution cryostat, 8:34304 (R;DE)
Photon induced reactions, 8:34791 (R;DE)
Two photon physics with the TASSO detector, 8:34749 (R;DE)
Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)
Analysis of the disparity in electricity rates among electric utilities, 8:33619 (R;US)
Comparison of the electric-utility industry with other major business sectors, 8:33620 (R;US)
Potential impact of the President's economic recovery plan on the electric-utility industry - with Commonwealth Edison Company serving as a case study, 8:33864 (R;US)
Bremen Univ. (Germany, F.R.)
Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission, 8:33847 (R;DE;In German)
Bristol Univ. (UK). H.H. Wills Physics Lab.
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)
Brookhaven National Lab., Upton, NY (USA)
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R;US)
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R;US)
Detecting heavy flavors at CBA, 8:34747 (R;US)
Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra, 8:34511 (R;US)
Electrical conductivity of doped polyacrylonitrile (PAN), 8:34013 (R;US)
Evaluated nuclear structure data file. A manual for preparation of data sets, 8:34790 (R;US)
Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R;US)
Fast asynchronous level 1 pre-trigger for electrons at L = $10^{33} cm^{-2} sec^{-1}$, 8:34300 (R;US)
Flash pyrolysis of coal with reactive and non-reactive gases. Progress report, October 1, 1981-September 30, 1982, 8:32946 (R;US)
Glueballs in the reaction $\pi^- p \rightarrow$ phi phi n, 8:34746 (R;US)
Monochromatic radio frequency accelerator cavity, 8:34263 (R;US)
Operation of the AFS at L = $1.4 \times 10^{32} cm^{-2} sec^{-1}$: a first look at data at high luminosity from the CERN ISR, 8:34301 (R;US)
Photochemical energy conversion and solution kinetics, 8:34177 (R;US)
Pulsed power supply system for the fast quadrupoles in the AGS, 8:34299 (R;US)
Ranking of environments in stress-corrosion cracking, 8:33955 (R;US)
Recent developments at BNL, 8:34302 (R;US)
Recent upgrading of the Brookhaven double MP facility and plans for the future, 8:34303 (R;US)
Review of the Rancho Seco Nuclear Generating Station Unit No. 1 auxiliary feedwater-system reliability analysis, 8:33764 (R;US)
Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R;US)
Study of momentum transfer in two-fluid formulation of two-phase flow, 8:34230 (R;US)
Thermal neutron capture gamma-rays, 8:34789 (R;US)
Track chambers for high luminosity, 8:34352 (R;US)
Transition from collective to noncollective rotation at high spin in N ≃ 87 nuclei, 8:34831 (R;US)
Transport in rectangular quadrupole channels, 8:34281 (R;US)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R;US)
Worldwide applications of ground-coupled heat pumps, conventional and solar assisted, 8:33890 (R;US)
Bundesministerium fuer Bauten und Technik, Vienna (Austria). Sektion 4 - Technisches Versuchwesen
Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2, 8:33899 (R;AT;In German)
Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)
Absorption heat pump for heating small residential buildings, 8:33888 (R;DE;In German)
Application and further development of ion implantation for very large scale integration. Pt. 1, 8:34242 (R;DE;In German)
Application and further development of ion implantation for very large scale integration. Pt. 2, 8:34243 (R;DE;In German)
Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R;DE;In German)
Application of modern surface analytical methods for the solution of problems of technical catalysts, 8:34089 (R;DE;In German)
Between riding and flying, 8:33927 (R;DE)
Crude gas/air fuel cells with fixed phosphoric acid, 8:33881 (R;DE;In German)
Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant, 8:33666 (R;DE;In German)
Design and standardisation of meteorological measurements for wind energy converting systems, 8:33585 (R;DE;In German)
Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures >=90°C, 8:33780 (R;DE;In German)
Development and application of process and device-simulation for 2μm MOS technology, 8:34244 (R;DE;In German)
Development of a silicon gate CMOS technology with small structures, 8:34245 (R;DE;In German)

Development of a stationary battery for high load with increased efficiency of load levelling, 8:33782 (R;DE;In German)
Development of ceramic automobile turbine engine components, 8:33947 (R;DE;In German)
Development of heat exchangers for reheating scrubbed flue gas in a pilot plant, 8:33616 (R;DE;In German)
Development up to the construction stage of a quasiliquid surface storage, in particular for a liquid gas, ball thrust container, 8:34216 (R;DE;In German)
Fundamental examinations for the mechanisation of the support work in headings by blasting and by using selective cut heading machines, 8:34258 (R;DE;In German)
Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R;DE;In German)
Gross properties of nuclei and nuclear excitations. Proceedings, 8:34761 (R;DE)
Heating of domestic water by waste heat recovery from household refrigerating equipment, 8:33887 (R;DE;In German)
Improvement of plutonium recycling in boiling water reactors by irradiation experience and experiments, 8:33664 (R;DE;In German)
Improvement of reactor physics design methods for plutonium recycling in pressurized water reactors, 8:33702 (R;DE;In German)
Improvement of reactor physics design methods for plutonium recycling in boiling water reactors, 8:33663 (R;DE;In German)
Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R;DE;In German)
Investigations on the influence of mineral matter of coals and cokes on the kinetics of gasification with hydrogen and water vapour, 8:33014 (R;DE;In German)
Irradiation behaviour of UO_2/PuO_2 mixed oxide fuel in the experiments IFA 427 and IFA 428 in the Halden boiling water reactor, 8:33687 (R;DE;In German)
Large industrial gas turbine for medium and peak load service, 8:33617 (R;DE;In German)
Measuring system for high-power circuit breaker, 8:33627 (R;DE;In German)
Microelectronic temperature sensor; silicon temperature sensor, 8:34385 (R;DE;In German)
Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R;DE;In German)
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R;DE;In German)
Power ramp experiments with mixed oxide (UO_2/PuO_2) fuel rods, 8:33727 (R;DE;In German)
Practical and theoretical analysis of continuous selection of temperature layers in a hot water tank by an experimental tank and a simulation model, 8:33549 (R;DE;In German)
Qualification of the fuel technology for the plutonium recycling in light water reactors, 8:33667 (R;DE;In German)
Reduction of noise emitted by medium-speed diesel engines by partial encasing, 8:33946 (R;DE;In German)
Reduction of the energy consumption of an existing building by replacement of the building facade, demonstrated at the office building of EWAG, Nuernberg, 8:33889 (R;DE;In German)
Seismic reflection investigation of structural and lithologic parameters in the area of the Urach geothermal anomaly, 8:33554 (R;DE;In German)
Silicon material development for terrestrial solar cells, 8:34019 (R;DE;In German)
Solar energy futures in a Western European context, 8:33824 (R;DE;In German)
Solar energy futures in a Western European context, 8:33825 (R;DE;In German)
SRC II - demonstration plant project for synfuel production from coal in the USA, 8:32944 (R;DE;In German)
Stress reduction at the production of bottle-cap screws, 8:33930 (R;DE;In German)
Testing of heat exchanger systems for reheating flue gases from wet scrubbing desulfurization plants, 8:32943 (R;DE;In German)
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R;DE;In German)
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 1, 8:33931 (R;DE;In German)
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 2, 8:33932 (R;DE;In German)
Wave motion in an estuary, 8:33578 (R;DE;In German)

Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)
Brazil - energy situation 1981, 8:33832 (R;DE;In German)
Chile - energy situation 1981, 8:33789 (R;DE;In German)
Cyprus - energy situation 1981, 8:33834 (R;DE;In German)
Energy industry of Bolivia 1981, 8:33788 (R;DE;In German)
Energy industry of France 1981, 8:33830 (R;DE;In German)
Energy industry of Guatemala 1981, 8:33829 (R;DE;In German)
India - energy situation 1981, 8:33835 (R;DE;In German)
Luxembourg - energy situation 1981, 8:33837 (R;DE;In German)
Madagascar - energy situation 1981, 8:33840 (R;DE;In German)
Mexico - energy situation 1981, 8:33790 (R;DE;In German)
Nigeria - energy situation 1981, 8:33839 (R;DE;In German)
Turkey - energy situation 1981, 8:33836 (R;DE;In German)
Uganda - energy situation 1981, 8:33833 (R;DE;In German)

Bureau of Mines, Pittsburgh, PA (USA). Energy Research Center
Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R;US)

Bureau of Mines, Pittsburgh, PA (USA). Pittsburgh Research Center
Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982, 8:33077 (R;US)
Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/1982, 8:33078 (R;US)

Bureau of Radiological Health, Rockville, MD (USA)
Guide for compliance with television receiver reporting and testing program requirements (21 CFR 1002.10 and 1002.12) - revision. Report for Mar 77-Aug 82, 8:34860 (R;US)

Burns and Roe Industrial Services Corp., Paramus, NJ (USA)
Characterization of foreign electric-utility experiences for potential useful applications in the US, 8:33621 (R;US)

C

California Inst. of Tech., Pasadena (USA)
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R;US)

California Univ., Berkeley (USA)
Analysis of linearized decoupled power-flow approximations for steady-state security assessment, 8:33653 (R;US)
Analysis of linearized decoupled power-flow approximations for steady-state security assessment, 8:33656 (R;US)
Analysis of power flows without solving power flow equations, 8:33655 (R;US)
Effects of the accident at Three Mile Island on the mental health and behavioral responses of the general population and nuclear workers, 8:33750 (R;US)
Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach, 8:33654 (R;US)
Study of nonlinear oscillations due to exciter control using Hopf bifurcation, 8:33652 (R;US)
Study of nonlinear oscillations due to exciter control, 8:33657 (R;US)

California Univ., Berkeley (USA). Dept. of Electrical Engineering and Computer Sciences
Power-system security assessment and control, 8:33650 (R;US)

California Univ., Los Angeles (USA). Inst. of Geophysics and Planetary Physics
Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982, 8:33569 (R;US)

California Univ., Los Angeles (USA). School of Engineering and Applied Science
Transpired solar air heaters. Volume 3. Effect of wall suction on laminar entrance flow with application to solar air heaters. Final report, 8:33540 (R;US)

California Univ., Riverside (USA)
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)

California Univ., San Diego, La Jolla (USA). Dept. of Chemistry
Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C, 8:33577 (R;US)

California Univ., San Francisco (USA). School of Medicine
Effects of air pollution on airway function. Final report May 80-May 81, 8:34631 (R;US)
Cement- och Betonginstitutet, Stockholm (Sweden)
Hydration of fly ash cement and microstructure of fly ash cement pastes, 8:33017 (R;SE)
Centrala Driftledningen, Stockholm (Sweden)
Contact conference on acidification. Lectures, 8:33060 (R;SE;In Swedish)
Central Electricity Generating Board, London (UK)
Underclad cracking in PWR reactor vessels, 8:33681 (TG;GB)
Central Intelligence Agency, Washington, DC (USA)
International energy statistical review. Monthly reports, 8:33842 (R;US)
Centre National de la Recherche Scientifique, 75 - Paris (France)
Polycrystalline CdTe thin-film solar cells. Production by triode sputtering and short-distance transmission. Final report, 8:33325 (R;XE;In French and English)
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro
Majority rule model: real space renormalition group solution and finite size scaling, 8:34862 (R;BR)
Ceska Lekarska Spolecnost J.E. Purkyne, Prague (Czechoslovakia). Spolecnost Nuklearni Mediciny a Radiacni Hygieny
XVIIIth nuclear medicine days. Abstracts of papers, 8:34513 (R;CS;In Czech and Slovak)
Ceskoslovenska Akademie Ved, Prague. Ustav Geologie a Geotechniky
Seminar on nuclear methods in mining, geology, geophysics, and geochemistry. Abstracts of papers, 8:34675 (R;CS)
CEXEC, Inc., McLean, VA (USA)
Analysis of transportation network model and applications to coal market studies, 8:33852 (R;US)
Chalmers Tekniska Hoegskola, Goeteborg (Sweden)
Methods for the determination of thermal properties of soils and rocks, 8:33568 (R;SE;In Swedish)
Chevron Research Co., Richmond, CA (USA)
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Task 10. Hydrotreating of EDS and H-Coal blends for biological studies. Seventh interim report, 8:32947 (R;US)
Chicago Univ., IL (USA). Enrico Fermi Inst.
Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R;US)
City Coll., New York (USA)
Glueballs in the reaction $\pi^- p \rightarrow$ phi phi n, 8:34746 (R;US)
Clarkson Coll. of Tech., Potsdam, NY (USA)
The migration of fluid droplets and their interactions in a thermal gradient, 8:34741 (R;US)
Wood-fired steam production at Clarkson College of Technology. Final report, 8:33935 (R;US)
Clube de Engenharia, Rio de Janeiro (Brazil)
Proceedings of the Second Brazilian Congress of Energy, 8:34951 (R;BR;PT)
Colorado State Univ., Fort Collins (USA)
Development of a day by day simulation of solar systems, 8:33408 (R;US)
Colorado Univ., Boulder (USA). Dept. of Computer Science
Toolpack Fio library installers' guide, 8:34955 (R;US)
Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements
X-ray-diffraction study of californium metal to 16 GPa, 8:33958 (R;US)
Commission of the European Communities, Luxembourg
Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods, 8:34633 (R;US)
Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report, 8:33308 (R;US)
Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report, 8:33798 (R;US)
Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, Rio de Janeiro (Brazil)
Proceedings of the sixth symposium on theoretical physics. Nuclear physics, plasma physics and statistical mechanics, 8:34878 (R;BR)
Proceedings of the sixth symposium on theoretical physics. Solide state, biophysics and chemical physics, 8:34722 (R;BR)
Proceedings of the sixth symposium on theoretical physics. Elementary particle physics and relativity, 8:34781 (R;BR)
Cornell Univ., Ithaca, NY (USA)
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R;US)
Flow process in combustors, 8:34233 (R;US)
Cornell Univ., Ithaca, NY (USA). Lab. of Nuclear Studies
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R;US)
Cottrell Environmental Science, Somerville, NJ (USA)
Spray dryer/electron beam removal of SO_2 and NO/sub x/ from flue gas. First technical progress report, 1 October 1981-1 October 1982, 8:33020 (R;US)

D

Delegationen foer Energiforskning, Stockholm (Sweden)
Alternative motor fuels. A survey of the government R and D efforts, 8:33952 (R;SE;In Swedish)
Demand of energy by households. Some studies of the determining factors of the demand and of the effects of the allotment by energy taxation, 8:33892 (R;SE;In Swedish)
Effect of reduced dependence on oil. Some economic long-sighted calculations, 8:33822 (R;SE;In Swedish)
Energy of tomorrow. Description of techniques and appraisement of the future, 8:33807 (R;SE;In Swedish)
Delft Hydraulics Lab. (Netherlands)
Wave kinematics and fluid loading in irregular waves, 8:34679 (R;US)
Department of Energy, Aiken, SC (USA). Savannah River Operations Office
Environmental protection analysis and planning for proposed Savannah River Plant actions, 8:34440 (R;US)
Department of Energy, Bartlesville, OK (USA). Bartlesville Energy Research Center
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R;US)
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R;US)
Department of Energy, Las Vegas, NV (USA). Nevada Operations Office
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R;US)
Department of Energy, Oak Ridge, TN (USA). Technical Information Center
Radioactive waste processing and disposal: a bibliography, 8:33201 (R;US)
Department of Energy, Washington, DC (USA)
Federal energy R and D priorities: report of the Energy Research Advisory Board, 8:33808 (R;US)
Department of Energy, Washington, DC (USA). Div. of Geothermal Energy
Report on DOE's direct heat program, 8:33566 (R;US)
Department of Energy, Washington, DC (USA). Office of Energy Research
Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee, 8:34312 (R;US)
Department of Energy, Washington, DC (USA). Office of Inspector General
Office of Inspector General FY 1983 semiannual report, October 1, 1982-March 31, 1983, 8:33785 (R;US)
Peoria weatherization program, 8:33786 (R;US)
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Goettingen (Germany, F.R.)
A model analysis of separation initiated external combustion in supersonic flow over a flat plate, 8:34232 (R;US)
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)
Generation of higher levels of turbulence in the test section of the High Speed Cascade Wind Tunnel Braunschweig for simulation of turbomachinery conditions, 8:34217 (R;DE;In German)

Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.). Inst. fuer Hochfrequenztechnik
Radar meteorology in cloud physics and radio wave propagation research, 8:34394 (R;DE;In German)
Deutsche Shell A.G., Hamburg (Germany, F.R.)
World's energy sources - possibilities and limits, 8:33803 (R;DE;In German)
Dortmund Univ. (Germany, F.R.). Abt. Maschinenbau
Thermo-elastoplastic material law for application of the finite element method to calculate thermal loads, 8:33965 (R;DE;In German)
Dortmund Univ. (Germany, F.R.). Abt. Physik
Development of a low-pressure proportional chamber for particle detection in ion-X-ray-coincidence experiments and a study of inner shell differential ionisation probabilities, 8:34519 (R;DE;In German)
Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet
Subtoxic lead exposure of the albino rat during different phases of development and its effects on the open-field behaviour and the learning ability as studied by discrimination tests, 8:34624 (R;DE;In German)
Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
Alternatives for definse waste-salt disposal, 8:33206 (R;US)
Comparison of simulated to actual plutonium deposition at the Savannah River Plant, 8:34414 (R;US)
Decontaminated salt disposal as saltcrete in a landfill. Technical data summary, 8:33214 (R;US)
Development of a load cell for mechanical testing in hydrogen, 8:33959 (R;US)
DWPF process control, 8:33204 (R;US)
Effects of tritium in elastomers, 8:34015 (R;US)
Environmental protection analysis and planning for proposed Savannah River Plant actions, 8:34440 (R;US)
Evaluation of glass-contact materials for waste glass melters, 8:33207 (R;US)
EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R;US)
Gas production from alpha radiolysis of concrete containing TRU incinerator ash. Progress report 2, August 1-November 30, 1978, 8:34043 (R;US)
Hazards analysis of TNX Large Melter-Off-Gas System, 8:33213 (R;US)
Physical modeling of a glass melter designed for vitrification of defense waste, 8:33208 (R;US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R;US)
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R;US)
Predicting transport requirements for radioactive-waste slurries, 8:33187 (R;US)
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R;US)
Reactivity monitoring during reactor-reloading operations, 8:33736 (R;US)
Removal of sludge from waste tanks, 8:33212 (R;US)
Representativeness of calculated peak and annual average concentrations, 8:34413 (R;US)
Security and risk analysis at Savannah River, 8:34957 (R;US)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R;US)
Tank 16 demonstration: multipump test results, 8:33211 (R;US)
Testing and economical evaluation of U(IV) in Purex, 8:33183 (R;US)
Two-dimensional simulation of drainage flow and tracer gas transport in the Geysers area, 8:34397 (R;US)
Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R;US)
Tank 16 demonstration: single-pump test results, 8:33210 (R;US)
East Anglia Univ. (UK)
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)
Ecole Normale Superieure, 75 - Paris (France). Lab. de Physique Theorique
Topics in quarkonium physics, 8:34758 (R;US)
EG and G, Inc., Goleta, CA (USA)
Aerial testing of KrF-laser-based fluorosensor, 8:34386 (R;US)
EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R;US)
Eidgenoessische Kommission fuer die Gesamtenergiekonzeption, Bern (Switzerland)
Catalogue of possible energy policy measures, 8:33848 (R;CH;In German)
Energy supply assurance in Switzerland, 8:33838 (R;CH;In German)
Swiss energy concept, 8:33831 (R;CH;In German)
Swiss energy concept. Final report. Vol. 2, 8:33841 (R;CH;In German)
Electronic Data Systems Corp., Panama City, FL (USA)
Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82, 8:34666 (R;US)
ELKRAFT A.m.b.A., Hellerup (Denmark)
Energy R and D in Sweden, 8:33805 (R;SE)
Knowledge about energy. An inventory of Swedish energy systems studies and some hypothesis of research needs, 8:33806 (R;SE;In Swedish)
Long range energy demand, 8:33794 (R;SE;In Swedish)
Energetics, Inc., Columbia, MD (USA)
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R;US)
Energietechnik G.m.b.H., Essen (Germany, F.R.). Studiengesellschaft fuer Enerkgieumwandlung, -Fortleitung und -Anwendung
Efficient energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Final report. Pt. A, 8:33409 (R;DE;In German)
Energie-Versorgung Schwaben A.G., Stuttgart (Germany, F.R.)
Bibliography of the electric power industry of Wuerttemberg, 8:33869 (R;DE;In German)
Energy Services, Inc., Idaho Falls, ID (USA)
Geothermal Exploratory-Well Project: city of Alamosa, Colorado. Final report, September 1980-April 1983, 8:33556 (R;US)
Energy Technology Engineering Center, Canoga Park, CA (USA)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Engineering-Science, Inc., Arcadia, CA (USA)
Design and operation of a demonstration sanitary landfill developed to optimize the generation and capture of combustible gas, 8:33938 (R;US)
Environmental Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Facility
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R;US)
Environmental Protection Agency, Washington, DC (USA)
Carcinogen assessment of coke oven emissions (revised draft), 8:33100 (R;US)
Environmental Systems Research Inst., Redlands, CA (USA)
Survey of spatial data needs and land use forecasting methods in the electric utility industry. Final Report, 8:34432 (R;US)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Medizin
Investigations of subclinical neurogenous damage of persons with chronic occupational exposure to lead and trichlorethylene, 8:34627 (R;DE;In German)
Investigations on a cortisol-iodine-125-radioimmunoassay test system, 8:34531 (R;DE;In German)
Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths, 8:34522 (R;DE;In German)
Esso A.G., Hamburg (Germany, F.R.)
Energistic '81, 8:33870 (R;DE;In German)
European Organization for Nuclear Research, Geneva (Switzerland)
Data acquisition using the 168/E, 8:34321 (R;US)

Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)

F

Fachverband der Erdoelindustrie Oesterreichs, Vienna (Austria)
Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs, 8:33148 (R;AT;In German)
Fermi National Accelerator Lab., Batavia, IL (USA)
Topics in quarkonium physics, 8:34758 (R;US)
Florida Univ., Gainesville (USA). Dept. of Physics
B-L violating supersymmetric couplings, 8:34765 (R;US)
Forest Service, Fort Collins, CO (USA). Rocky Mountain Forest and Range Experiment Station
Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R;US)
Forschungszentrum Graz (Austria). Inst. fuer Umweltforschung
Development of a solar, absorption-type refrigerator - preliminary study in the course of scientific cooperation between Austria and India, 8:33405 (R;AT;In German)
Freie Univ. Berlin (Germany, F.R.). Fachbereich Humanmedizin
Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen, 8:34524 (R;DE;In German)
Scintigraphic evaluation of the sacroiliac joints in anklylosing spondylitis, 8:34523 (R;DE;In German)
Study of cerebral metastases by means of computerized tomography, 8:34535 (R;DE;In German)
Freie Univ. Berlin (Germany, F.R.). Medizinische Fakultaet
Negative brain scintigrams in brain tumors, 8:34518 (R;DE;In German)

G

GAI Consultants, Inc., Monroeville, PA (USA)
Longitudinal unbalanced loads on transmission-line structures: documentation of computer programs BRODI2 and BROFLX, 8:33660 (R;US)
Gas Research Inst., Chicago, IL (USA)
There's more to erosion control than protecting the pipe, 8:33164 (R;US)
GA Technologies, Inc., San Diego, CA (USA)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis, 8:33682 (R;US)
Structured multi-stream command language, 8:34926 (R;US)
Gelles (S.H.) Associates, Columbus, OH (USA)
Phase separation in transparent liquid-liquid miscibility gap systems, 8:34740 (R;US)
General Electric Co., Philadelphia, PA (USA). Space Systems Div.
Composite flywheels: status and performance assessment and projections, 8:33779 (R;US)
General Electric Co., San Jose, CA (USA). Nuclear Engineering Div.
BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R;US)
General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center
Improved transistorized ac motor controller for battery powered urban electric passenger vehicles, 8:33951 (R;US)
General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.
Getter pumping speed measurements in the range 10^{-2} to 10^{-7} liters per second, 8:33262 (R;US)
Geological Survey, Denver, CO (USA)
Audio-magnetotelluric data log and station location map for the Glamis Known Geothermal Resource Area, California, 8:33558 (R;US)
Audio-magnetotelluric data log and station location map for the Saline Valley Known Geothermal Resource Area, California, 8:33559 (R;US)
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R;US)
Computer program for borehole compensation of dual-detector density well logs, 8:34389 (R;US)
Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R;US)
Literature review of interaction of oxidized uranium species and uranium complexes with soluble organic matter, 8:34678 (R;US)
Principal facts for a gravity survey of the Double Hot Springs Known Geothermal Resource Area, Humboldt County, Nevada, 8:33561 (R;US)
Principal facts for a gravity survey of the Fly Ranch Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33563 (R;US)
Principal facts for a gravity survey of the Gerlach Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33562 (R;US)
Telluric profile location map and telluric data for the Glamis Known Geothermal Resource Area, California, 8:33560 (R;US)
Geological Survey, Menlo Park, CA (USA)
Seismic monitoring at The Geysers Geothermal Field, California, 8:33553 (R;US)
Geological Survey, Washington, DC (USA)
Geology, structure, and uranium deposits of the Marble Canyon 1° x 2° Quadrangle, Arizona, 8:33177 (R;US)
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R;US)
Georgia Univ., Athens (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)
Geotechnics, Inc., Columbus, OH (USA)
Applications manual for analyzing landfill methane-recovery data using the Computer Analysis of Field Data (CAFD) interactive graphics system, 8:33940 (R;US)
Gesamthochschule Duisburg (Germany, F.R.)
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R;BE;In German)
Gesellschaft fuer Aerosolforschung e.V., Bad Soden (Germany, F.R.)
Aerosols in science, medicine, and technology. Aerosols in and from industrial processes, 8:33184 (R;DE;GE)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Bereich Projekttraegerschaften
Biological effects of UV-B radiation, 8:34575 (R;DE)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Radiohydrometrie
Institute for Radiohydrometry - annual report 1980, 8:34441 (R;DE;In German)
Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Inst. voor Experimentele Gerontologie
REP Annual Report 1981, 8:34586 (R;NL)
Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Primatencentrum
REP Annual Report 1981, 8:34586 (R;NL)
Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Radiobiologisch Inst. TNO
REP Annual Report 1981, 8:34586 (R;NL)
Ghent Rijksuniversiteit (Belgium). Lab. voor Elektronica en Meettechniek
System analysis of the interconnection of 5-kW solar panels with the power lines. Final report, 8:33362 (R;XE)
GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Finite element analysis for evaluation of eigenfrequency and natural shape alterations by welded joint cracks for pipes of offshore-platforms, 8:34260 (R;DE;In German)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Nuclear constants, 8:34853 (R;SU)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij
Proceedings of the international seminar on high energy physics and quantum field theory. Vol. 1, 8:34743 (R;SU)
Greater Egypt Regional Planning and Development Commission, Carbondale, IL (USA)
Erosion potential of reclaimed agricultural lands in Perry County. Final report, 8:34434 (R;US)
Great Plains Gasification Associates, Detroit, MI (USA)
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983, 8:32949 (R;US)
Gulf Research and Development Co., Pittsburgh, PA (USA)
Improving coal-liquid quality by heavy-distillate recycle, 8:32945 (R;US)

H

Hagler, Bailly and Co., Washington, DC (USA)
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R;US)
Hannover Univ. (Germany, F.R.). Fakultaet fuer Mathematik und Naturwissenschaften
Investigation of flow bed models for hydrogenating coal gasification, 8:32959 (R;DE;In German)
Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$, 8:34173 (R;DE;In German)
Harvard Univ., Boston, MA (USA). Dept. of Environmental Health Sciences
Critical review of the reactor-safety study radiological health effects model. Final report, 8:33766 (R;US)
Harvard Univ., Cambridge, MA (USA)
Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R;US)
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry
Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R;US)
Heidelberg Univ. (Germany, F.R.). Naturwissenschaftliche Gesamtfakultaet
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R;DE)
Design and testing of the measuring equipment for the detection of ^{71}Ge and ^{68}Ge within the gallium-solar-neutrino experiment, 8:34533 (R;DE;In German)
Routine apparatus for marine ^{85}Kr-samples, 8:34468 (R;DE;In German)
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R;US)
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics
Invariant systems under the space-time inversion. Existence of the two kinds of the invesions, 8:34884 (R;JP)
Low energy behavior of a quantized scalar field in the linearly expanding universe, 8:34786 (R;JP)
Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric, 8:34784 (R;JP)
Quantum theory of massive Yang-Mills fields, 2. Gauge covariance, 8:34785 (R;JP)
Role of infrared phase factors in quantum electrodynamics, 8:34787 (R;JP)
Some properties of the symmetry axis in a superpostion of two Kerr solutions, 8:34883 (R;JP)
Hochtemperatur-Kernkraftwerk G.m.b.H. (HKG), Uentrop (Germany, F.R.)
Business report 1980 of the HKG, 8:34464 (R;DE;In German)
Hoegskolan i Lulea (Sweden). Adv. foer Bergmekanik
Small houses in rocks. Preliminary study, 8:33896 (R;SE;In Swedish)

I

ICF, Inc., Washington, DC (USA)
Analysis of the electric utility industry in the US: an assessment of the national and regional cost and rate impacts of restoring utility financial health, 8:33623 (R;US)
Analysis of the electric-utility industry in the US: an overview of selected analyses assessing the financial health of the utility industry, 8:33622 (R;US)
Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants, 8:33624 (R;US)
Idaho National Engineering Lab., Idaho Falls (USA)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Illinois Univ., Chicago (USA). Dept. of Medicinal Chemistry
Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80, 8:34571 (R;US)
Illinois Univ., Urbana (USA). Fusion Studies Lab.
SSBAPAC user manual, 8:34925 (R;US)
Indian Inst. of Tech., Madras. Dept. of Mechanical Engineering
Experimental and analytical investigation of high temperature ignition of ethanol, 8:33274 (R;US)
Ingenjoersvetenskapsakademien, Stockholm (Sweden)
Contact conference on acidification. Lectures, 8:33060 (R;SE;In Swedish)
Innsbruck Univ. (Austria)
Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel, 8:33879 (R;DE;In German)
Instituet foer Vatten- och Luftvaardsforskning, Karlskrona (Sweden)
Effects of the water soluble fractions of oil from the tanker Sefir on the myside, Neonmysis integer, 8:33152 (R;SE)
Institute of Gas Technology, Chicago, IL (USA)
Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982, 8:32952 (R;US)
Institute of Nuclear Physics, Krakow (Poland)
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R;US)
Institutet foer Vatten- och Luftvaardsforskning, Stockholm (Sweden)
Biogas in China 1981 - a travel report, 8:33327 (R;SE;In Swedish)
Contact conference on acidification. Lectures, 8:33060 (R;SE;In Swedish)
Experimental firing with Brini, at Eksjoe, April 1981, 8:33278 (R;SE)
Technique for the purification of metal containing mining waters. Literature survey, 8:33056 (R;SE;In Swedish)
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon, 8:34687 (R;BR;In several languages)
INTERA Environmental Consultants, Inc., Houston, TX (USA)
DACRIN: a computer program for calculating organ dose from acute or chronic radionuclide inhalation, 8:34601 (R;US)
FFSM: Far-Field State Model. Technical report, 8:33224 (R;US)
GETOUT: a computer code for one-dimensional analytical solution for radionuclide transport, 8:33242 (R;US)
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R;US)
MMT: a random-walk one-dimensional multicomponent mass-transport code, 8:33241 (R;US)
PABLM: a computer code to compute accumulated radiation doses from radionuclides transported to aquatic and terrestrial pathways in the biosphere, 8:33251 (R;US)
PHREEQE: a geochemical speciation and mass-transfer code suitable for nuclear waste performance assessment, 8:34676 (R;US)
Workshop on uncertainty analysis of postclosure nuclear waste isolation system performance, 8:33223 (R;US)
Inter/Face Associates, Inc., Middletown, CT (USA)
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R;US)
International Centre for Theoretical Physics, Trieste (Italy)
Ambiguities of functional integrals for fermionic systems, 8:34870 (R;XA)

Approximate solution with torsion for a charged particle in a gauge theory of gravitation, 8:34874 (R;XA)
Breakdown of predictability: an investigation on the nature of singularities, 8:34888 (R;XA)
Commutativity of charge superselection rules in standard quantum field theory, 8:34772 (R;XA)
Conference on differential geometric methods in theoretical physics, 30 June - 3 July 1981. Extended abstracts, 8:34890 (R;XA)
Geon-type solutions of the non-linear Heisenberg-Klein-Gordon equation, 8:34768 (R;XA)
Irreducible representations of the simple Lie groups II - the tensor basis for the infinitesimal generators of the exceptional groups, 8:34889 (R;XA)
Limitations of quantum measurements I: Determination of the minimal amount of non-ideality and identification of the optimal measuring apparatuses, 8:34869 (R;XA)
Limitations on quantum measurements II: Analysis of a model example, 8:34871 (R;XA)
Localizability of massless particles in the framework of the conformal group, 8:34891 (R;XA)
Montonen-Olive conjecture, 8:34771 (R;XA)
N=2 massive matter multiplet from quantization of extended classical mechanics, 8:34777 (R;XA)
N-anti N oscillation in SO(10) and SU(6) supersymmetric grand unified models, 8:34776 (R;XA)
Natural embedding of Peccei-Quinn symmetry in flavor grand unification, 8:34774 (R;XA)
New approach to unified field theories, 8:34769 (R;XA)
Non-existence of extended physical states in the Schwinger model, 8:34770 (R;XA)
Possibility of a fourth test of general relativity in earth's gravitational field, 8:34873 (R;XA)
QCD sum rules of the Laplace transform type for the gluon component of the U(1)sub(A) meson mass, 8:34759 (R;XA)
Quantum effective potential in $S^1 x R^3$, 8:34773 (R;XA)
Quantum limitations for spin measurements on systems of arbitrary spin, 8:34872 (R;XA)
Reason for SU(6) grand unification, 8:34775 (R;XA)
Recursive formula for the evaluation of <psi'T-circumflexsub(μnu)(x)'psi> and its application in the semi-classical theory of gravity, 8:34875 (R;XA)
Scattering matrix element of the three body reactive collision, 8:34868 (R;XA)
Some aspects of gravitational waves in an isotropic background universe, 8:34876 (R;XA)

International Energy Associates Ltd., Washington, DC (USA)
Examination of mechanical snubbers from TMI-2. Final report, 8:33743 (R;US)

INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R;US)
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R;US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R;US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R;US)

Inveresk Research International Ltd., Musselburgh (UK)
Tier II mutagenic screening of 13 NIOSH priority compounds: individual compound report, n,n-dimethylformamide, 8:34634 (R;US)

Iowa State Univ. of Science and Technology, Ames (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)

J

Japan Atomic Energy Research Inst., Tokyo
Negative ion formation and neutralization processes, (1). Related to plasma heating by 'negative ion based neutral beam injection', 8:34899 (R;JP;In Japanese)

Jet Propulsion Lab., Pasadena, CA (USA)
Generation of a strong core-centering force in a submillimeter compound droplet system, 8:34911 (R;US)

Johns Hopkins Univ., Baltimore, MD (USA). Dept. of Environmental Health Sciences
Study of the molecular basis for radiation mutagenesis. Final progress report, 8:34574 (R;US)

Jordbrugsoekonomisk Inst., Copenhagen (Denmark)
How much is a biogas system to cost. Operational evaluation of biogas in agriculture, 8:33348 (R;DK;In Danish)

Jordbrukstekniska Inst., Uppsala (Sweden)
Technical equipment for the cultivation of energy forest, 8:33328 (R;SE;In Swedish)

JWK International Corp., Annandale, VA (USA)
Model documentation of the Short-Term Coal Analysis System. Volume 2. Model description, 8:33857 (R;US)
Model documentation of the Short-Term Coal-Analysis System. Volume 1. Model overview, 8:33856 (R;US)
Model documentation of the Short-Term Coal-Analysis System. Volume 3. SCOAL data documentation, 8:33858 (R;US)

JWK International Corp., Pittsburgh, PA (USA)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R;US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R;US)

K

Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen
Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R;DE;In German)

Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort (USA)
Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982, 8:33199 (R;US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982, 8:33198 (R;US)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)
Problems of non-proliferation and nuclear safeguards, 8:34470 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R;DE;In German)
Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger, 8:33708 (R;DE;In German)
REACT/THERMIX - a computer code to calculate graphite corrosion due to accidents in pebble-bed reactors, 8:33747 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Radioagronomie
$^{18}O/^{16}O$ ratio in groundwater of the Federal Republic of Germany, 8:34667 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente
Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel, 8:33879 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung
Construction of helium-heated steam reformers for high-temperature-reactors, 8:33686 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen
Graphitic matrix materials for spherical HTR fuel elements, 8:33685 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung
Analysis and evaluation of energy forecasting for the Federal Republic of Germany. Vol. 2, 8:33827 (R;DE;In German)
Embedding energy industry into economy, 8:33792 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projektleitung Energieforschung
Implementing agreement for a programme of research and development on wind energy conversion systems, 8:33593 (R;DE)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung Allgemeine Technologie
Impact tests with fuel element cans, 8:34218 (R;DE;In German)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung fuer Chemische Analyse
Analytical chemistry in the People's Republic of China, 8:34053 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)
Program for the ultimate static load of spatial steel frames, 8:34219 (R;DE;In German)
Treatment of waste water and sewage sludge - research promoted by the BMFT, 8:34588 (R;US)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Ingenieurtechnik
Results of research- and development works 1981 of the Main Department of Engineering, 8:33818 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik 2
Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV, 8:34811 (R;DE)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik
Results of research and development works 1981 of the Institute of Data Processing in the Field of Engineering, 8:34958 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie
X-ray-diffraction study of californium metal to 16 GPa, 8:33958 (R;US)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernverfahrenstechnik
Results of research and development work 1981 of the Institute of Nuclear Engineering, 8:34954 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Zyklotronlaboratorium
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R;DE)
Final report on R + D works in 1981, 8:34792 (R;DE;In German)
Kernkraftwerk Lingen G.m.b.H., Darme/Lingen (Germany, F.R.)
Report on the 18th business year 1981, 8:34466 (R;DE;In German)
Kiel Univ. (Germany, F.R.). Inst. fuer Weltwirtschaft
Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea, 8:33797 (R;DE)
Kiel Univ. (Germany, F.R.). Medizinische Fakultaet
Radiotherapy of breast fibrosis, 8:34516 (R;DE;In German)
Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet
Improvement of the detection efficiency of Li-drifted Ge-detectors for \-radiation by irradiance with infrared-light of the wavelength 1.520μm to 1.795μm, 8:34520 (R;DE;In German)
Ktech Corp., Albuquerque, NM (USA)
Analytical and experimental studies on penetration into geological targets, 8:34225 (R;US)

L

Laboratoires d'Electronique et de Physique Appliquee (LEP), 94 - Limeil-Brevannes (France)
Deposit of polycrystalline layers of silicon on a conducting substrate, beginning with the liquid phase. Final report, 8:33326 (R;XE;FR)
La Radiotechnique Compelec (RTC), 14 - Caen (France)
Study of solar module technology with good thermal dissipation. Final report, 8:33323 (R;XE;FR)
Lawrence Berkeley Lab., CA (USA)
Array of 1- to 2-GHz electrodes for stochastic cooling, 8:34288 (R;US)
Beam dynamics and vane geometry in the LBL Heavy-Ion RFQ, 8:34287 (R;US)
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R;US)
Computer studies of multiple-quantum spin dynamics, 8:34881 (R;US)
Conceptual magnet design for an iron-free colliding beam accelerator, 8:34289 (R;US)
Current experiments in elementary-particle physics, 8:34750 (R;US)
Design of a dedicated heavy ion accelerator for radiotherapy, 8:34317 (R;US)
ECR heavy-ion source for the LBL 88-inch cyclotron, 8:34320 (R;US)
Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R;US)
Effects of transient combustion phenomena on molecular-beam sampling, 8:34212 (R;US)
Existence criteria for fluid interfaces in the absence of gravity, 8:34738 (R;US)
High-performance control system for a heavy-ion medical accelerator, 8:34318 (R;US)
Improved field stability in RFQ structures with vane-coupling rings, 8:34286 (R;US)
Investigation of the conductivity distribution in the vicinity of a cascade volcano, 8:33557 (R;US)
Isochronous stacking-ring approach to the HTE, 8:34290 (R;US)
Large-area non-crystalline semiconductor detectors, 8:34379 (R;US)
LBL Magnetic-Measurements Data-Acquisition System, 8:34314 (R;US)
Limited-angle problem in tomography and some related mathematical problems, 8:34962 (R;US)
Long-pulse induction acceleration of heavy ions, 8:34270 (R;US)
Magnet coil system for a superconducting spectrometer (HISS), 8:34315 (R;US)
Mechanical design of a heavy-ion RFQ, 8:34271 (R;US)
Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R;US)
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R;US)
Permanent multipole magnets with adjustable strength, 8:34292 (R;US)
Picosecond studies of vibrational linewidth broadening in liquids, 8:34091 (R;US)
Quadrupole beam-transport experiment for heavy ions under extreme space charge conditions, 8:34284 (R;US)
Quantitation of oil shale wastewater quality. A manual of analytical methods, 8:33175 (R;US)
Question of mode-specificity in unimolecular reaction dynamics, 8:34178 (R;US)
Roof apertures in office buildings, 8:33894 (R;US)
Simulation of HVAC equipment in the DOE-2 program, 8:33893 (R;US)
Slotted coax as a beam electrode, 8:34316 (R;US)
Specific heat of ^{3}He in the Fermi-liquid region, 8:34739 (R;US)
Stochastic cooling: recent theoretical directions, 8:34291 (R;US)
9.1-T iron-free Nb-Ti dipole magnet with pancake windings, 8:34319 (R;US)
Threshold behavior for longitudinal stability of induction linac bunches, 8:34283 (R;US)
Time-domain multiple-quantum NMR, 8:34795 (R;US)
Ventilation by stratification and displacement, 8:33895 (R;US)
Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R;US)
Lawrence Livermore National Lab., CA (USA)
1981 laser program annual report, 8:34943 (R;US)
A2900 meta assembler user manual, 8:34968 (R;US)
Advanced Lasers Program. Program/contracting plan, 8:34940 (R;US)
Advanced Lasers Program: advanced laser concepts. Technical summary, 8:34942 (R;US)
Advanced lasers program: National Laboratory programs, 8:34941 (R;US)
Analysis of circumferential cracking in hydroformed bellows, 8:34215 (R;US)
Applied uses of nuclear level densities, 8:34824 (R;US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II, 8:34407 (R;US)

ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III, 8:34408 (R;US)
ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I, 8:34406 (R;US)
Axisymmetric ambipolar trap, 8:34908 (TG;US)
Comparison of the SANDYL Monte-Carlo code calculations of 20.9-MeV bremsstrahlung with published experimental data, 8:34861 (R;US)
Composite flywheels: status and performance assessment and projections, 8:33779 (R;US)
Computer-guided exploration of synthetic pathways. Final progress report, 8:34093 (R;US)
Design considerations for direct-illumination-driven inertial-fusion reactors, 8:34948 (R;US)
Developing a gate-array capability at a research and development laboratory, 8:34251 (R;US)
Field evaluation of tank track-pad failures, 8:34214 (R;US)
Four-way rf beam separator, 8:34293 (R;US)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R;US)
Large-block experiments in underground coal gasification, 8:32996 (R;US)
MEGA (Mechanical Engineering General Analysis) user's document, 8:34967 (R;US)
Mirror Advanced Reactor Study interim design report, 8:34945 (R;US)
Mirror fusion. Quarterly report, July-September 1982, 8:34944 (R;US)
Model for the growth of a two-phase corrosion scale, 8:33970 (R;US)
Modeling and monitoring a LAN, 8:34969 (R;US)
Nuclear energy in space, 8:33693 (TJ;US)
On the nature of 2 gamma bursts with spectral evolutions observed by the Konus experiment, 8:34690 (R;US)
Performance of an array of vertical dipoles over an inhomogeneous ground system, 8:34250 (R;US)
Plutonium separations, 8:34060 (R;US)
Projectile-power-compressed magnetic-field pulse generator, 8:34950 (R;US)
Review of the physics and response models for burnout of semiconductor devices, 8:34249 (R;US)
Simple method for damping transverse motion of a high intensity electron beam, 8:34294 (R;US)
Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures, 8:33179 (R;US)
Study of Cu-Be alloys in the vicinity of the eutectoid composition, 8:33999 (TG;US)
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R;US)
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R;US)
Technology demonstration report for the Mirror Fusion Test Facility (MFTF-B), 8:34946 (R;US)
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R;US)
Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R;US)
uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells, 8:34494 (R;US)
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R;US)
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R;US)

Little (Arthur D.), Inc., Cambridge, MA (USA)
Feasibility study of a sealed safety monitor for trucks carrying LNG and other hazardous materials, 8:33165 (R;US)

Lockman and Associates, Monterey Park, CA (USA)
Study of zones of vacuum influence surrounding landfill gas-extraction wells, 8:33939 (R;US)

Los Alamos National Lab., NM (USA)
Circuit model for the explosive-driven plate generator, 8:34928 (R;US)
Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants, 8:34617 (R;US)
Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R;US)
Development and test of a space-reactor-core heat pipe, 8:33692 (R;US)
Distributed processors and intelligent workstations at Los Alamos, 8:34961 (R;US)
Dynamic acceleration of nonlinear iterations, 8:34959 (R;US)
Electron-beam buncher to operate over the frequency range 1-4 GHz, 8:34285 (R;US)
Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations, 8:34854 (R;US)
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R;US)
Field-aligned currents near the magnetosphere boundary, 8:34696 (R;US)
Generation of a strong core-centering force in a submillimeter compound droplet system, 8:34911 (R;US)
Heat storage and distribution inside passive-solar buildings, 8:33407 (R;US)
High-performance computing at Los Alamos, 8:34960 (R;US)
Hybrid chemical and nondestructive analysis technique, 8:34054 (R;US)
Instability localized at the inner surface of an imploding spherical shell, 8:34929 (R;US)
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)
Modeling and analysis of inertial-confinement-fusion facilities, 8:34931 (R;US)
Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept, 8:34282 (R;US)
Nuclear reactor safety. Progress report, July 1-October 31, 1982, 8:33759 (R;US)
Nuclear reactor safety in the USA, 8:33749 (R;US)
Passive research and practice, 8:33406 (R;US)
Performance limits for smooth-wall gravity-assisted heat pipes, 8:34231 (R;US)
Plutonium isotopic measurement for small product samples, 8:34055 (R;US)
Possibility of studying crystal-field levels and excitations by μ^+ SR spectroscopy, 8:34864 (R;US)
Programmable calculator stress analysis, 8:34213 (R;US)
Slideline verification for multilayer pressure vessel and piping analysis, 8:33726 (R;US)
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R;US)
Submicron, unbacked, shaped metal foils, 8:33962 (R;US)
Theory of an active magnetic regenerative refrigerator, 8:34220 (R;US)
Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report, 8:33246 (R;US)
uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells, 8:34494 (R;US)

Louisville Univ., KY (USA)
Effects of inorganic lead on behavioral and neurologic function. Final report, 8:34635 (R;US)

Lund Univ. (Sweden)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)

Lund Univ. (Sweden). Dept. of Technical Microbiology
Methane fermentations. End product inhibition, thermophilic methane formation and production of methane from algae, 8:33329 (R;SE)

Lund Univ. (Sweden). Institutionen foer Organisk Kemi
Studies on iron and cobalt phthalocyanine catalysts for the electrochemical reduction of oxygen with special emphasis on their stability in acid electrolyte, 8:33884 (R;SE)

M

Macquarie Univ., North Ryde (Australia). School of Earth Sciences
Potential for an Australian uranium industry, 8:33817 (R;AU)

Marburg Univ. (Germany, F.R.). Fachbereich Humanmedizin
CO diffusion capacity, 8:34623 (R;DE;In German)

Marine Technology Society, Washington, DC (USA)
Proceedings of the 8th ocean energy conference, 8:33366 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.
Modeling of fluidized-bed combustion of coal. Volume IV. AFBC transient models. Final report, 8:33086 (R;US)
Massachusetts Inst. of Tech., Cambridge (USA). Lab. for Information and Decision Systems
Decisionmaking organizations with acyclical information structures. Technical report, 8:34476 (R;US)
Massachusetts Inst. of Tech., Oak Ridge, TN (USA). School of Chemical Engineering Practice
Phenol degradation in a three-phase fluidized-bed bioreactor, 8:33058 (R;US)
Thin-film evaporation of coal liquids, 8:33067 (R;US)
Materials Engineering Associates, Inc., Lanham, MD (USA)
Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R;US)
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R;US)
Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.). Inst. fuer Extraterrestrische Physik
Role of cyclotron resonance processes in the spectra of accreting neutron stars, 8:34683 (R;DE)
Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)
Remotely handled vacuum flange connections, 8:34927 (R;DE;In German)
Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.)
Gravitational wave detection by laser interferometry, 8:34882 (R;DE)
Simple mechanism for the release of laser targets, 8:34932 (R;DE)
Mayer Beratung, Planung, Ingenieurbearbeitung, Freigericht (Germany, F.R.)
Collection of arguments for and against the construction of Fast Breeder Reactors in underground nuclear facilities, 8:34471 (R;DE;In German)
McDonnell Douglas Astronautics Co., St. Louis, MO (USA)
Demonstration tokamak power plant, 8:34921 (R;US)
Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket, 8:34917 (R;US)
Neutron activation in EBT-P, 8:34912 (R;US)
Michigan Dept. of Commerce, Lansing (USA)
Michigan residential heating oil survey, winter 1982/83. Final report, 8:33853 (R;US)
Michigan State Univ., East Lansing (USA). Cyclotron Lab.
Proton capture to excited states of ^{16}O; Ml, El and Gamow-Teller transitions and shell-model calculations, 8:34799 (R;US)
Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya Ukrainskoj SSR, Kiev
Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection, 8:34682 (R;SU;RU)
Minnesota Univ., Minneapolis (USA). School of Physics and Astronomy
Second Z in SO(10), 8:34766 (R;US)
Monsanto Research Corp., Miamisburg, OH (USA). Mound
Effects of tritium contamination in the FED/INTOR reactor hall, 8:34916 (R;US)
Wall tritium contamination as a factor in fusion-reactor wall design, 8:34918 (R;US)
Montpellier-2 Univ., 34 (France)
New methods for preparing Cu_xS-CdS solar cell semiconductor materials. Final report, 8:33324 (R;XE;FR)
Muenchen Univ. (Germany, F.R.). Fachbereich Medizin
Clinical relevance of radioimmunologic gastrin determination for peptic ulcer, 8:34530 (R;DE;In German)
Neurological aspects of lead intoxication, 8:34626 (R;DE;In German)
Neurological aspects of mercury intoxication, 8:34625 (R;DE;In German)
Pre-surgical radiologic diagnostics of pancreas diseases, 8:34521 (R;DE;In German)
Sonography and computerized tomography in a comparison in renal mass diseases, 8:34528 (R;DE;In German)
X-ray cineradiography with particular and non-particular contrast-media. A comparative study for theory and praxis, 8:34526 (R;DE;In German)
Muenchen Univ. (Germany, F.R.). Fakultaet fuer Medizin
Perfusion measurements with radioactively labelled microspheres. Technique and computer-based evaluation, 8:34527 (R;DE;In German)

N

Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)
Bal 2 process, 8:33088 (R;SE;In Swedish)
Bioconversion of cellulose to liquid fuel (ethanol) and energy related chemicals, 8:33332 (R;SE;In Swedish)
Calculation of blade-data for the Hamilton standard structural analysis of the composite blade for the 18 meter diameter rotor and a comparison with FFA-calculation, 8:33605 (R;SE)
Comparison of wind measurements performed by SODAR and cup anemometer on mast, 8:33587 (R;SE;In Swedish)
Computer recording system for the assessment of the prototypes of wind power plants. Specified requirements, 8:33603 (R;SE;In Swedish)
Constructional basis of the project NE 5061481 composite rotor of Kalkugnen, 8:33604 (R;SE;In Swedish)
Distribution of organic matter, carbon and plant nutrients in soil in the early phase after clearcutting of a scots pine forest; with and without removal of logging slash, 8:33345 (R;SE)
Drying of fuel chips with solar panel warmed air, 8:33346 (R;SE;In Swedish)
Energy forestry in the north of Sweden, 8:33336 (R;SE;In Swedish)
Energy Reeds. Part 4., 8:33337 (R;SE;In Swedish)
Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet, 8:33606 (R;SE)
Evaluation of the decantation centrifuge process, 8:33080 (R;SE;In Swedish)
Evalution of the research project 'Forest Energy', 8:33876 (R;SE)
Geothermal energy extraction in Skaane. Final report, stage 4, 8:33552 (R;SE;In Swedish)
Harvesting and utilization of wood for energy purposes, 8:33339 (R;SE)
Heat storage in ground water, 8:33821 (R;SE;In Swedish, English)
Importance of cover and air under-base with storage of fuel chip chips, 8:33347 (R;SE;In Swedish)
Influence of the harmonics in rotor current on the wave shape of the stator voltage in a double-fed winddriven induction generator, 8:33609 (R;SE)
Insect damage to fast growing Salix and Populus species, 8:33333 (R;SE;In Swedish)
Investigation of a new type of generators without rotor windings to be used for wave energy conversion, 8:33582 (R;SE;In Swedish)
Joint IEA/IUFRO forestry energy workshop, 8:33338 (R;SE)
Logging residue as fuelwood in forest farmers houses, 8:33344 (R;SE;In Swedish)
Meeting on wave data for wave energy, 8:33581 (R;SE;In Norwegian and English)
Network for the measurement of wind energy at high masts, 8:33588 (R;SE;In Swedish)
Preliminary estimation of the expected noise levels from the Swedish WECS prototypes Maglarp and Naesudden, 8:33591 (R;SE)
Preliminary measurements of the waves at the Trubaduren lighthouse, 8:33583 (R;SE;In Swedish)
Pumping of peat slurry - at long distances, 8:33081 (R;SE;In Swedish)
Rationalization conference, 1981. Logging research foundation, 8:33343 (R;SE;In Swedish)
Reed harvesting Koeping, 8:33335 (R;SE;In Swedish)
Safety of wind energy conversion systems with horizontal axis (HA WECS), 8:33607 (R;SE)
Scaling of fuelwood and fuelchips, 8:33341 (R;SE;In Swedish)
Storing of stump wood in a simulated environment, 8:33340 (R;SE;In Swedish)
Testing of a small Darrieus turbine. Final report, 8:33608 (R;SE;In Swedish)
Thermal cracking of tars and hydrocarbons by adding oxygen and steam, 8:33331 (R;SE;In Swedish)
Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system, 8:33602 (R;SE;In Swedish)
TORVLINE - a digging system for peat evaluated from the point of national economy, 8:33076 (R;SE;In Swedish)

Updating of costs for production of methanol from natural gas and vacuum residue feedstock, 8:33160 (R;SE)
Wave data from Swedish coastal waters 1979-80, 8:33580 (R;SE;In Swedish)
Wave energy in the electric power system, 8:33584 (R;SE;In Swedish)
Wave power buoys. Model tests of energy absorption on irregular waves in a broad tank, 8:33579 (R;SE;In Swedish)
Wind power plant with a low speed electric generator, 8:33601 (R;SE;In Swedish)
Wood properties of salix caprea and salix pentandra, 8:33334 (R;SE;In Swedish)
Wood qualities and measurement of whole tree, 8:33342 (R;SE;In Swedish)

Nagoya Univ. (Japan). Inst. of Plasma Physics
Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy, 8:34726 (R;JP)
Interaction of ion-acoustic solitons in multi-dimensional space, 2, 8:34737 (R;JP)

National Academy of Sciences - National Research Council, Washington, DC (USA)
Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report, 8:34455 (R;US)

National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine, 8:33948 (R;US)
Effects of processing and dopant on radiation damage removal in silicon solar cells, 8:33330 (R;US)
High temperature composites. Status and future directions, 8:34010 (R;US)

National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4, 8:34688 (R;US)
Origin of relativistic particles and gamma-rays in quasars, 8:34686 (R;US)
Stationarity of magnetohydrodynamic fluctuations in the solar wind, 8:34684 (R;US)
Study of the diffuse galactic gamma radiation, 8:34685 (R;US)

National Aeronautics and Space Administration, Hampton, VA (USA). Langley Research Center
Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R;US)
Studies of implicit and explicit solution techniques in transient thermal analysis of structures, 8:34235 (R;US)

National Aeronautics and Space Administration, Huntsville, AL (USA). George C. Marshall Space Flight Center
Flow and thermal effects in continuous flow electrophoresis, 8:34237 (R;US)
The Pinhole/Occulter facility, 8:34689 (R;US)

National Aeronautics and Space Administration, Moffett Field, CA (USA). Ames Research Center
Analyses of the Konus catalogue of gamma-ray bursts with the thermal synchrotron model, 8:34691 (R;US)
Mount St. Helens aerosol evolution, 8:34395 (R;US)

National Aeronautics and Space Administration, Washington, DC (USA)
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R;US)

National Board for Science and Technology, Dublin (Ireland)
MEDEE 3: first results for Ireland and data collection. Final report, 8:33791 (R;XE)

National Bureau of Standards, Washington, DC (USA)
Role of the standards laboratory in brachytherapy. Final report, 8:34554 (R;US)
Thermoelectric refrigeration for temperatures below 100 K: A study of titanium sesquioxide, 8:33998 (R;US)

National Cancer Inst., Bethesda, MD (USA). International Cancer Research Data Bank
Cancer deteCTion and management: nuclear medicine. Cancergram ct02, 8:34555 (R;US)
Excision repair of DNA damage. I. Enzymology and mechanisms of excision repair. Oncology overview, 8:34602 (R;US)
Treatment of bladder cancer. Oncology overview, 8:34553 (R;US)

National Conference of State Legislatures, Denver, CO (USA)
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R;US)

National Governors' Association, Washington, DC (USA)
Analysis of options for structural reform in electric-utility regulation. Report of the NGA Task Force on electric utility regulation, 8:33844 (R;US)

National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R;US)
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R;US)
Health Hazard Evaluation Report No. HHA-80-238-931, new York Port Authority, Brooklyn, New York, 8:34630 (R;US)
Health Hazards Evaluation Report No. HETA-81-055-954, Cotter Corporation, Canon City, Colorado, 8:34603 (R;US)
Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R;US)

National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Physical Sciences and Engineering
Evaluation of a prototype portable microwave multi-gas analyzer. Technical report, 8:34405 (R;US)
Personal passive monitors for chemical agents. Technical report, 8:34404 (R;US)

National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Surveillance, Hazard Evaluation and Field Studies
Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R;US)

National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Training and Manpower Development
Ionizing radiation lab. Manual (584), 8:34604 (R;US)

National Inst. of Environmental Health Sciences, Research Triangle Park, NC (USA)
Endogenous retrovirus and radiation-induced leukemia in the RMF mouse, 8:34572 (R;US)

National Marine Fisheries Service, Juneau, AK (USA). Alaska Region
Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83, 8:33156 (R;US)

National Maritime Inst., Feltham (UK)
Coal-liquid mixtures. A technical study, 8:33084 (R;SE;In Swedish)

National Oceanic and Atmospheric Administration, Rockville, MD (USA)
Ecological study of the 'Amoco Cadiz' oil spill, 8:33155 (R;US)

National Oceanic and Atmospheric Administration, Rockville, MD (USA). Office of Ocean Engineering
Ocean thermal energy conversion cold water pipe workshop. Volume I of III, 8:33403 (R;US)

National Science Foundation, Washington, DC (USA)
Guide to programs, fiscal year 1983, 8:33809 (R;US)

National Science Foundation, Washington, DC (USA). Div. of Physics
Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee, 8:34312 (R;US)

National Science Foundation, Washington, DC (USA). Div. of Policy Research and Analysis
Non-governmental research and development investments in selected energy technologies. Summary report, 8:33804 (R;US)

Naval Energy and Environmental Support Activity, Port Hueneme, CA (USA)
PCB compliance, assessment, and spill control guide, 8:34439 (R;US)

Naval Research Lab., Washington, DC (USA)
Current status of calculations and measurements of ion stopping power in ICF plasmas, 8:34939 (R;US)
Threshold behavior for longitudinal stability of induction linac bunches, 8:34283 (R;US)

New England Fuel Inst., Watertown, MA (USA)
Semi-automatic wood gasifier coupled with an adjunct oil-fired boiler/burner unit, 8:33321 (R;US)

New Mexico Univ., Albuquerque (USA)
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R;US)

New Mexico Univ., Albuquerque (USA). Technology Application Center
Solar power generation: a bibliography with abstracts. Quarterly update, October-December, 1982, 8:33279 (R;US)
New York State Geological Survey, Albany (USA)
Geologic and hydrologic research at the Western New York Nuclear Service Center, West Valley, New York. Annual report, August 1981-July 1982, 8:34668 (R;US)
New York Univ., NY (USA)
Production and consumption of non-fuel minerals to the year 2030 analyzed within an input-output framework of the US and world economy (techniques for consistent forecasting of future demand for major minerals using an input-output framework), 8:33793 (R;US)
Niels Bohr Inst., Copenhagen (Denmark)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)
Nordwestdeutsche Kraftwerke A.G., Hamburg (Germany, F.R.)
Business report of the NWK 79: 1st October 1977 - 30th September 1978, 8:33941 (R;DE;In German)
Norges Skipsforskningsinstitutt, Oslo
Hydrodynamics of underwater blowouts, 8:33154 (R;NO)
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R;NO)
North Central Forest Experiment Station, St. Paul, MN (USA)
Harvesting wood for energy, 8:33356 (R;US)
North Dakota Univ., Grand Forks (USA). Dept. of Chemical Engineering
Evolution of the UND-government-industry partnership in low-rank coal research, 8:32941 (R;US)
Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R;US)
North Dakota Univ., Grand Forks (USA). Energy Research Center
Evolution of the UND-government-industry partnership in low-rank coal research, 8:32941 (R;US)
Relationship of coal science to coal technology, 8:33015 (R;US)
Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R;US)
North Dakota Univ., Grand Forks (USA). School of Engineering and Mines
Evolution of the UND-government-industry partnership in low-rank coal research, 8:32941 (R;US)
Novo Industri A/S, Bagsvaerd (Denmark)
Fuel ethanol from agricultural crops. A review, 8:33349 (R;DK)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Rules and Records
NRC Regulatory Agenda. Quarterly report, January-February 1983. Vol. 2, No. 1, 8:33697 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Inspection and Enforcement
NRC Incident-Response Plan, 8:33751 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards
Environmental impact appraisal for renewal of Special Nuclear Material License No. SNM-1168. Docket No. 70-1201, 8:33181 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation
Generic implications of ATWS events at the Salem Nuclear Power Plant: generic implications. Vol. 1, 8:33754 (R;US)
Safety evaluation report related to the construction of the Clinch River Breeder Reactor Plant. Docket No. 50-537. Suppl. 1, 8:33699 (R;US)
Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1, 8:33696 (R;US)
Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1, 8:33698 (R;US)
Safety evaluation report related to the operation of WPPSS Nuclear Project No. 2. Docket No. 50-397 , 8:33752 (R;US)
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research
NRC's limit on intake of uranium-ore dust, 8:33247 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R;US)
NUS Corp., San Francisco, CA (USA)
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R;US)

O

Oak Ridge Associated Universities, Inc., TN (USA)
Doctoral scientists and engineers working in energy-related activities, 1981, 8:34952 (R;US)
Oak Ridge National Lab., TN (USA)
1982 UCC-ND/GAT environmental protection seminar: proceedings, 8:34449 (R;US)
Analytical Chemistry Division annual progress report for period ending December 31, 1982, 8:34059 (R;US)
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R;US)
Buildings energy research: a bibliography. Publications of the Building Systems Division, 8:33901 (R;US)
Bulk Shielding Facility quarterly report October, November, and December 1982, 8:33734 (R;US)
Carbon utilization in fluidized-bed combustion systems, 8:34256 (R;US)
Characterization of hydrofracture grouts for radionuclide migration, 8:33196 (R;US)
Chemical characterization of the smokes of selected US commercial cigarettes: tar, nicotine, carbon monoxide, oxides of nitrogen, hydrogen cyanide, and acrolein, 8:34402 (R;US)
Compositional changes in red and violet smoke mixes after combustion, 8:34396 (R;US)
Electron heating and superthermal electron enhancement due to electron cyclotron heating in ISX-B at 28 GHz, 8:34900 (R;US)
Endogenous retrovirus and radiation-induced leukemia in the RMF mouse, 8:34572 (R;US)
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090, 8:34400 (R;US)
Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site, 8:33565 (R;US)
Fifth topical meeting on the technology of fusion energy, 8:34924 (R;US)
Forecasting consequences of accidental release: how reliable are current assessment models, 8:33739 (R;US)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Gaseous dielectrics III, 8:34020 (R;US)
Heat-pump desuperheaters for supplying domestic hot water - estimation of energy savings and economic viability for residential applications, 8:33900 (R;US)
High-temperature gas-cooled-reactor safety studies for the Division of Accident Evaluation. Quarterly progress report, July 1-September 30, 1982. Volume 3, 8:33760 (R;US)
In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R;US)
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R;US)
Interconnection problems associated with small dispersed electric generators and inverter devices, 8:33651 (R;US)
Intrinsic factors that can affect sensitivity to chromosome-aberration induction, 8:34573 (R;US)
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R;US)
Low-speed sliding damage in TiB_2-Ni composites, 8:34009 (R;US)
Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R;US)
MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation, 8:34902 (R;US)
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface, 8:33765 (R;US)
Need to develop a short-term Chinese hamster in-vivo specific-locus mutational assay, 8:34615 (R;US)

Pairing correction for particle-hole state densities, 8:34846 (R;US)
Physical chemistry of molten-salt batteries. Final report, October 1, 1981-September 30, 1982. LiCl precipitation from LiCl-KCl anolyte in porous Li-Al electrodes, 8:33783 (R;US)
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)
Program plan for research and development of technologies and systems for electric-power systems under the influence of nuclear electromagnetic pulses, 8:33659 (R;US)
Programmer's guide to FFE: a fast front-end data-acquisition program, 8:34933 (R;US)
PRP-4: an updated version of the discounted-cash-flow program PRP, 8:34964 (R;US)
Relationships of irradiation creep to swelling implicit in the theories of these processes, 8:33957 (R;US)
Resonant ion transport in EBT, 8:34901 (R;US)
Response of aluminum and its alloys to exposure in the high flux isotope reactor, 8:33735 (R;US)
Role of environment, 8:34424 (R;US)
Strain differences and solvent effects in mouse skin carcinogenesis experiments using carcinogens, tumor initiators, and promoters, 8:34616 (R;US)
Transition from collective to noncollective rotation at high spin in N ≈ 87 nuclei, 8:34831 (R;US)
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment, 8:32960 (R;US)
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R;US)
X-ray-diffraction study of californium metal to 16 GPa, 8:33958 (R;US)

Oak Ridge Y-12 Plant, TN (USA)
Computer programs for calculating thermal distribution on uranium-6 weight percent niobium alloy during electron-beam welding, 8:33974 (R;US)

Oesterreichischer Verband fuer Strahlenschutz (OeVS), Vienna. Studiengruppe fuer Radioaktivitaetsmessungen im Donauraum (OeSRAD)
Radioactivity of different building materials. Proceedings of the 7. annual meeting of the OeSRAD held in Vienna, Austria, May 1981, 8:34425 (R;AT;GE)

O.E.T., Villemomble (France)
Low-enthalpy geothermal energy for local heating. Final report, 8:33567 (R;XE;FR)

Office of Technology Assessment (U.S. Congress), Washington, DC
Impacts of technology on US cropland and rangeland productivity, 8:34475 (R;US)

Ohio State Univ., Columbus (USA)
Time dependence of ground heat loss from solar ponds, 8:33538 (R;US)

Ohio State Univ. Research Foundation, Columbus (USA)
Chemical carcinogen (hydrazine et al.) induced carcinogenesis of human diploid cells in vitro. Annual progress report 1 Sep 81-31 Aug 82, 8:34612 (R;US)

Oklahoma State Univ., Stillwater (USA)
Investigations of flowfields found in typical combustor geometries, 8:34234 (R;US)

Oklahoma Univ., Norman (USA). Engineering Foundation
International conference on microbial enhancement of oil recovery, 8:33104 (R;US)

Old Dominion Univ., Norfolk, VA (USA)
Radiation effects studies for the high-resolution spectrograph, 8:34246 (R;US)

Oregon State Univ., Corvallis (USA)
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R;US)

Oregon State Univ., Corvallis (USA). Dept. of Mechanical Engineering
Response of the Mod-OA wind-turbine rotor to turbulent atmospheric wind, 8:33592 (R;US)

Otter Group, Trondheim (Norway)
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R;NO)
Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires, 8:33145 (R;NO)

Oxford Univ. (UK). Nuclear Physics Lab.
Proton capture to excited states of ^{16}O; M1, E1 and Gamow-Teller transitions and shell-model calculations, 8:34799 (R;US)

P

Pacific Northwest Lab., Richland, WA (USA)
Environmental surveillance at Hanford for CY 1982, 8:34435 (R;US)
Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks, 8:34415 (R;US)
Impact of conservation measures on Pacific Northwest residential energy consumption. Final report, 8:33902 (R;US)
Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2, 8:33762 (R;US)
Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3, 8:33763 (R;US)
Interactive Rapid Dose Assessment Model (IRDAM): user's guide, 8:33761 (R;US)
MCC stress-corrosion-cracking rate tension test method (MCC-104S), 8:33967 (R;US)
Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R;US)
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R;US)
RECON: a computer program for analyzing repository economics. Documentation and user's manual, 8:33188 (R;US)
Remote design features for the West Valley slurry-fed ceramic melter system, 8:33232 (R;US)

Pavia Univ. (Italy). Ist. di Fisica
NMR studies of fast-ion conductors, 8:34863 (R;US)

Pennsylvania State Univ., University Park (USA)
Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982, 8:33742 (R;US)

Pennsylvania State Univ., University Park (USA). Materials Research Lab.
Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R;US)

Pennsylvania Univ., Philadelphia (USA)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)

Pennsylvania Univ., Philadelphia (USA). Dept. of Mechanical Engineering and Applied Mechanics
Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report, 8:33404 (R;US)

Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Forschungs- und Messreaktor
Assembler routines for process-control using the microcomputers Commodore cbm 3032/4032/8032, 8:34965 (R;DE;In German)

Polska Akademia Nauk, Wroclaw. Inst. Niskich Temperatur i Badan Strukturalnych
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)

Power Technologies, Inc., Schenectady, NY (USA)
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R;US)

Preussische Elektrizitaets-A.G. (Preussenelektra), Hannover (Germany, F.R.)
Interim storage of spent fuel elements in transport containers in the yard of the nuclear power plant Wuergassen, 8:34467 (R;DE;In German)

Princeton Univ., NJ (USA). Dept. of Chemical Engineering
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R;US)

Princeton Univ., NJ (USA). Plasma Physics Lab.
Application of the stellarator expansion for plasma-stability studies in stellarators, 8:34905 (R;US)
Axisymmetric scrape-off plasma transport, 8:34937 (R;US)
Environmental monitoring report for calendar year 1982, 8:34935 (R;US)
High-energy tritium beams as current drivers in tokamak reactors, 8:34904 (R;US)
Implications of polarized DT plasmas for toroidal fusion reactors, 8:34934 (R;US)
Modeling of ICRF heating of a tokamak plasma, 8:34903 (R;US)
Pulse pile-up effects, 8:34906 (R;US)
Reduced equations for internal kinks in tokamaks, 8:34907 (R;US)
Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R;US)

Puerto Rico Electric Power Authority, San Juan. Electrical Planning and Research Div.
Electric-utility-system planning studies for OTEC power integration by Puerto Rico Electric Power Authority. Final report, 8:33402 (R;US)
Purdue Univ., Lafayette, IN (USA)
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R;US)

R

Ransom and Casazza, Inc., Washington, DC (USA)
Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C, 8:33862 (R;US)
Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C, 8:33863 (R;US)
Raymond Kaiser Engineers, Inc., Oakland, CA (USA)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 1. Technical report, 8:33072 (R;US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 2. Terrace pit planning and operations manual, 8:33073 (R;US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan, 8:33074 (R;US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment, 8:33075 (R;US)
Research Triangle Inst., Research Triangle Park, NC (USA)
Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R;US)
Resource Dynamics Corp., McLean, VA (USA)
Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C, 8:33862 (R;US)
Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C, 8:33863 (R;US)
Resource Planning Associates, Inc., Washington, DC (USA)
Comparing the effects of three nuclear power plants on future electricity prices, 8:33865 (R;US)
RE/SPEC, Inc., Rapid City, SD (USA)
Constitutive properties of salt from four sites, 8:34670 (R;US)
Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV (USA)
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R;US)
Rhode Island State Fuel Allocation Office, Providence (USA)
Survey on prices, volumes, and inventory data for residential and rack No. 2 heating oil, October 1, 1982-May 31, 1983, 8:33854 (R;US)
Rice Univ., Houston, TX (USA)
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)
Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Posgraduacao de Engenharia
Proceedings of the Second Brazilian Congress of Energy, 8:34951 (R;BR;PT)
Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center
Data acquisition and control for LMFBR component testing, 8:33688 (R;US)
Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant
Calibration of and conversion charts for Matheson rotameters, 8:34387 (R;US)
Process for removal of heavy-metal ions from waste water, 8:33944 (TG;US)
Rockwell International Corp., Golden, CO (USA). Wind Energy Research Center
Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems, 8:33611 (R;US)
Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations
Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site, 8:33244 (R;US)
Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R;US)
Rutgers--the State Univ., New Brunswick, NJ (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)

S

Saint Louis Univ., MO (USA)
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R;US)
Sandia National Labs., Albuquerque, NM (USA)
Allowable shipment frequencies for the transport of toxic gases near nuclear power plants, 8:33757 (R;US)
Aluminum electromigration lifetime variations with linewidth: the effects of changing stress conditions, 8:34248 (R;US)
Analytical and experimental studies on penetration into geological targets, 8:34225 (R;US)
Are most low-density knapsacks solvable in polynomial time, 8:34966 (R;US)
Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:34223 (R;US)
Current status of calculations and measurements of ion stopping power in ICF plasmas, 8:34939 (R;US)
Design of a redundant-load-path lifting fixture for the Clinch River Breeder Reactor Plant spent-fuel shipping cask, 8:34222 (R;US)
Effects of curing and aging on the triaxial properties of concrete in underground structures, 8:34044 (R;US)
Empirically determined uncertainty in potassium-argon ages for Plio-Pleistocene basalts from Crater Flat, Nye County, Nevada, 8:34669 (R;US)
Emulation of multi-axis numerically controlled machine tools, 8:34226 (R;US)
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels), 8:33968 (R;US)
General method for fatigue analysis of vertical-axis wind-turbine blades, 8:33613 (R;US)
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)
Numerical studies of laboratory triaxial creep tests, 8:34673 (R;US)
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:33256 (R;US)
Proceedings of the eighth underground coal conversion symposium, 8:32961 (R;US)
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R;US)
Quality assurance in packaging design through the peer review process, 8:34224 (R;US)
Radionuclide transport code development in support of nuclear waste storage investigations, 8:33245 (R;US)
Silicone encapsulant development for fireset applications, 8:34017 (R;US)
Space-charge effects in irradiated Si_3N_4 films, 8:34384 (R;US)
Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R;US)
Study on the E-beam pulse width scaling for a 25-kilojoule KrF amplifier, 8:34229 (R;US)
Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1, 8:33221 (R;US)
Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6, 8:33248 (R;US)
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R;US)
Wakes of isolated Darrieus turbines, 8:33614 (R;US)
Sandia National Labs., Livermore, CA (USA)
Slow-strain-rate testing of 2.25Cr-1Mo in molten-nitrate salt, 8:33969 (R;US)

Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R;US)
Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R;US)

Savannah River Ecology Lab., Aiken, SC (USA)
Comparison of simulated to actual plutonium deposition at the Savannah River Plant, 8:34414 (R;US)

Scandpower A/S, Oslo (Norway)
Risk analysis - safety program. Summary report, 8:33142 (R;NO)
Risk analysis, gas and oil leakages, 8:33143 (R;NO)

Science Applications, Inc., Boulder, CO (USA)
Magnetic-coil optimization for quadrupole-stabilized mirror systems, 8:34938 (R;US)

Science Applications, Inc., Idaho Falls, ID (USA)
Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R;US)

Science Applications, Inc., McLean, VA (USA)
Case studies of electric-generating-plant demographics: efficiency and availability enhancements, 8:33618 (R;US)

Science Applications, Inc., Oak Ridge, TN (USA)
Analyzing industrial energy demand: organization and analysis of information, 8:33826 (R;US)

Science Applications, Inc., Rockville, MD (USA)
Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R;US)

Science Research Council, Chilton (UK). Rutherford and Appleton Labs.
Mass loss from astronomical objects. RAL workshop on astronomy and astrophysics, 8:34692 (R;GB)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)

Science Research Council, Daresbury (UK). Daresbury Lab.
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)

Seri Renault Engineering, Bois d'Arcy (France)
Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report, 8:33361 (R;XE;FR)

Solar Energy Research Inst., Golden, CO (USA)
Open-loop transport of solar energy using natural-gas networks, 8:33354 (R;US)
Revised renewable resource calculation procedures for the RCS program, 8:33410 (R;US)

Southampton Univ. (UK)
The metallurgical structure and mechanical properties at low temperature of Nitronic 40 with particular reference to its use in the construction of models for cryogenic wind tunnels, 8:33997 (R;US)

South Dakota State Univ., Brookings (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)

Southwest Research Inst., San Antonio, TX (USA)
Mechanisms of smoke reduction in the high-pressure combustion of emulsified fuels. Volume II. Experimental and theoretical study of evaporating emulsified and neat fuel sprays. Annual progress report No. 2, 29 September 1980-29 September 1981, 8:34210 (R;US)

Spectron Development Labs., Inc., Costa Mesa, CA (USA)
Experimental regulation of advanced solar central receivers. Final report, 8:33539 (R;US)

SRI International, Menlo Park, CA (USA)
Improved diagnostic model for estimating wind energy, 8:33589 (R;US)

Stanford Linear Accelerator Center, CA (USA)
Charmonium spectroscopy from radiative decays of the J/psi and psi', 8:34753 (R;US)
Data acquisition using the 168/E, 8:34321 (R;US)
Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R;US)
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R;US)

Statens Naturvaardsverk, Solna (Sweden)
Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R;SE;In Swedish)

Statens Naturvaardsverk, Stockholm (Sweden)
Contact conference on acidification. Lectures, 8:33060 (R;SE;In Swedish)

Statens Provningsanstalt, Boraes (Sweden)
Radon release from building material, 8:34416 (R;SE)

Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE
Calculation of sulfur precipitation on a national scale, 8:33062 (R;SE;In Swedish)
Cleaning of steam coal prior to combustion, 8:32958 (R;SE;In Swedish)
Emission of mercury from an ash disposal, 8:33063 (R;SE;In Swedish)
Emission of sulfur from combustion of coal and oil. Report in response to supplementary instructions to the project Coal Health Environment, 8:33064 (R;SE;In Swedish)
Formation and reduction of NO sub (x) and POM in coal firing, 8:33057 (R;SE;In Swedish)

Stichting Energieonderzoek Centrum Nederland, Petten
The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983, 8:33087 (R;NL)

Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden)
Coal cleaning by physical methods prior to combustion, 8:33085 (R;SE;In Swedish)

Storstockholms Energi AB, Stockholm (Sweden)
STOSEB 80. Regional energy plan, 8:33828 (R;SE;In Swedish)

Studsvik Energiteknik AB, Nykoeping (Sweden)
Specifications and design of a laminar-flow isothermal drop tube furnace for studies of pulverized fuel combustion., 8:33089 (R;SE)
Temperature booster of waste heat for room heating, 8:33937 (R;SE;In Swedish)

Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme
Economic consequences of the delay in the nuclear energy developing programme in Baden-Wuerttemberg considering topical cost-analyses on the power generation sector, 8:33813 (R;DE;In German)
Performance limits for smooth-wall gravity-assisted heat pipes, 8:34231 (R;US)

Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung
Calculation of turbulence phenomena in plasma focus dynamics using REDUCE, 8:34898 (R;DE)
Numerical simulation of echo phenomena in plasma, 8:34895 (R;DE;In German)
Selection criteria on laser-detector systems for scattering-diagnostics of fusion-plasmas, 8:34896 (R;DE;In German)
Theory of neutron spectra from d-d-reactions in the linear z-pinch and the plasma focus, 8:34897 (R;DE)

Styrelsen foer Teknisk Utveckling, Stockholm (Sweden)
Determination of methyl nitrite in automobile exhaust gases, 8:33276 (R;SE;In Swedish)
Refrigeration of milk - heating of dwelling-houses. Experimental evidence, 8:33936 (R;SE;In Swedish)

Svensk Metanolutveckling AB, Stockholm
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R;SE;In Swedish)

Sveriges Industriforbund, Stockholm
Contact conference on acidification. Lectures, 8:33060 (R;SE;In Swedish)

Sveriges Lantbruksuniversitet, Umeaa. Inst. foer Skogstaxering
Biomass of Scots pine (Pinus Sylvestris L.). Amount-development-methods for mensuration, 8:33355 (R;SE;In Swedish)

Swedish State Power Board, Vaellingby
Air/water heat pump in the block Brigaden, Linkoeping (Sweden), 8:33411 (R;SE;In Swedish)
Air/water heat pumps for three houses in Gothenburg (Sweden), 8:33295 (R;SE;In Swedish)
Heat pump for waste water in Sala, Sweden, 8:33904 (R;SE;In Swedish)
Heat pump for waste water in Sundsvall, (Sweden), 8:33905 (R;SE;In Swedish)
Sala 3.2 MW waste water heat pump measurements. Operation experiences. Report 1., 8:33903 (R;SE;In Swedish)

Systems Consultants, Inc., Washington, DC (USA)
Regulation of solid wastes from coal-gasification and -liquefaction facilities: an analysis of Federal and selected state hazardous-waste management programs under RCRA, 8:33021 (R;US)

T

Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bauwesen
Simple method for evaluation of the maximum thermal residual stresses in multi-layer external structural members, 8:33897 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen
Determination of expected breakage of raw coal muck by simulated operational stress with special regard to raw-material influence parameters, 8:33082 (R;DE;In German)
Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany, 8:33065 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen
Numerical calculation of three-dimensional long-time temperature fields using a special finite element method: the final storage of highly radioactive waste in salt rocks, 8:34463 (R;DE;In German)
Studies for the layout and technical conception of a two-circuit HTR power plant of 600 MWsub(el) under public utilizer aspects, 8:34469 (R;DE;In German)
Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal, 8:33707 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Medizinische Fakultaet
Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R;DE;In German)
Technische Hochschule Darmstadt (Germany, F.R.). Inst. fuer Kernphysik
Gross properties of nuclei and nuclear excitations. Proceedings, 8:34761 (R;DE)
Technische Hochschule Darmstadt (Germany, F.R.). Inst. fuer Statik und Stahlbau
Fatigue strength improvement of welded high-strength steels StE 460 and StE 690 by TIG dressing, 8:33966 (R;DE;In German)
Technische Hogeschool Delft (Netherlands)
Pressure losses in pneumatic transport. A model based on particle-wall interactions and particle density distribution, 8:34236 (R;US)
Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations, 8:33229 (R;NL)
Underground storage of radioactive waste in rock salt: organization of the work concerning the underground storage of radioactive waste, 8:33230 (R;NL)
Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt, 8:33231 (R;NL)
Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik
X-ray emission of high voltage vacuum devices, 8:34517 (R;DE;In German)
Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen
Briquetting behaviour of the raw fine coal sulphite waste lye mixtures and stability of the agglomerates with pressure gasification, 8:33083 (R;DE;In German)
Investigation on the stress of miners by dry and hot climatic conditions, 8:34610 (R;DE;In German)
Investigations on the assessment and optimization of solidifying weakly radioactive to medium radioactive wastes with hydraulic binders for a new storage technique in salt formations, 8:34472 (R;DE;In German)
Stress of the drilling shaft in deep-well drilling, 8:33134 (R;DE;In German)
Technische Univ. Darmstadt (Germany, F.R.). Inst. fuer Technische Stroemungslehre
Experimental investigation of shock initiated methane-combustion near a wall, 8:33264 (R;DE)
Technische Univ., Graz (Austria)
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R;AT;In German)
Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik
Experimentals on the energy-deposition of fast neutrons in phantoms, 8:34534 (R;DE;In German)
Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen
Determination of a knock criterion of the Otto-engine combustion and precalculation of the knock limit, 8:33950 (R;DE;In German)
Hierarchically structured identification and classification method for vibration control of reactor components, 8:34465 (R;DE;In German)
Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R;DE;In German)
Technische Univ. Muenchen (Germany, F.R.). Lehrstuhl A fuer Thermodynamik
Model to calculate the temperature characteristics of heat storage basins, 8:33781 (R;DE;In German)
Technische Univ., Vienna (Austria)
Spectroscopic investigations of a field emission generated radiative zone: Mass spectroscopic measurements. Final Report, 8:33926 (R;US)
Tekniska Hoegskolan, Lund (Sweden). Institutionen foer Kaernfysik
Composition of the aerosol of a clean air region. Final report, 8:34399 (R;SE;In Swedish)
Tekniska Hoegskolan Stockholm (Sweden). Inst. fuer Kulturteknik
Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R;SE;In Swedish)
Tel Aviv Univ. (Israel)
Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)
Tennessee Univ., Knoxville (USA). Dept. of Chemistry
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R;US)
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R;US)
Tennessee Univ., Knoxville (USA). Dept. of Nuclear Engineering
EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R;US)
Tennessee Valley Authority, Muscle Shoals, AL (USA)
Summary biomass research conference: Southeastern region, 8:33874 (R;US)
Texas Energy and Natural Resources Advisory Council, Austin (USA)
Texas Energy and Natural Resources Advisory Council activities and accomplishments. Annual report, 8:33860 (R;US)
Texas Tech Univ., Lubbock (USA)
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)
Texas Univ., Austin (USA). Center for Energy Studies
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R;US)
Texas Univ., Austin (USA). Inst. for Fusion Studies
MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation, 8:34902 (R;US)
Non-Maxwellian ion distributions caused by neoclassical heat conduction, 8:34894 (R;US)
Thermacore, Inc., Leola, PA (USA)
Development of a high efficiency warm-air furnace using heat-pipe principles, 8:33891 (R;US)
Tieraerztliche Hochschule Hannover (Germany, F.R.)
Roentgenologic examinations on the larynx of the horse, 8:34515 (R;DE;In German)
Tokyo Inst. of Tech. (Japan). Dept. of Mechanical Engineering
Study on the ignition of a fuel droplet in high temperature stagnant gas, 8:34211 (R;US)

Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study
Comment on the Adler-Bardeen theorem in non-Abelian gauge theories, 8:34782 (R;JP)
Path integral of relativistic strings, 8:34783 (R;JP)
TRW Energy Engineering Div., McLean, VA (USA)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan, 8:33074 (R;US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment, 8:33075 (R;US)
TRW Energy Systems Planning Div., McLean, VA (USA)
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R;US)
TRW Systems, Redondo Beach, CA (USA)
Fusion-breeder-reactor design studies, 8:34949 (R;US)
Tsentral'nyj Nauchno-Issledovatel'skij Inst. Informatsii i Tekhniko-Ehkonomicheskikh Issledovanij po Atomnoj Nauke i Tekhnike, Moscow (USSR)
Nuclear constants, 8:34853 (R;SU)
Tuebingen Univ. (Germany, F.R.). Medizinische Fakultaet
Radioimmunologic determination of testosterone and 5α-dihydrotestosterone in the plasma of women with hirsutism, 8:34525 (R;DE;In German)
Reliability and accuracy of mammography in the diagnosis of breast carcinomas, 8:34532 (R;DE;In German)

U

United Engineers and Constructors, Inc., Philadelphia, PA (USA)
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R;US)
United Technologies Corp., South Windsor, CT (USA). Power Systems Div.
4.8-MW fuel-cell demonstrator. Final report, 8:33883 (R;US)
United Technologies Research Center, East Hartford, CT (USA)
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R;US)
UTRC 15-kW wind-system development. Phase II: fabrication and testing, 8:33610 (R;US)
Universite du Haut-Rhin, Mulhouse (France)
New methods for preparing Cu_2S-CdS solar cell semiconductor materials. Final report, 8:33324 (R;XE;FR)
University of Southern California, Los Angeles (USA). Dept. of Chemical Engineering
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R;US)
UOP, Inc., Des Plaines, IL (USA)
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R;US)
Uppsala Univ. (Sweden). Inst. of Technology
Preparation and characterization of solar absorbing films on stainless steel, 8:33541 (R;SE;In Swedish)
Solar absorbing properties of thermally oxidized stainless steel, 8:33542 (R;SE;In Swedish)
Spectrally selective films for IR-reflectance of lamp bulbs, 8:33972 (R;SE;In Swedish)
Uppsala Univ. (Sweden). Meteorologiska Institutionen
Investigating the Gill UVW-anemometer as a rugged turbulence instrument for wind power applications, 8:33615 (R;SE)
USDOE Assistant Secretary for Management and Administration, Washington, DC. Directorate of Procurement and Assistance Management
Report to Congress on the Small-Business Program of the Department of Energy, 8:33795 (R;US)
USDOE Bartlesville Energy Technology Center, OK
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R;US)
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R;US)
International conference on microbial enhancement of oil recovery, 8:33104 (R;US)
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R;US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R;US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R;US)
USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use
1982 annual energy outlook: with projections to 1990, 8:33146 (R;US)
Model documentation: Short-Term Integrated Forecasting System Demand Model, 8:33855 (R;US)
USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas
Natural gas market through 1990, 8:33162 (R;US)
Natural gas monthly, 8:33161 (R;US)
USDOE Grand Forks Energy Technology Center, ND
Evolution of the UND-government-industry partnership in low-rank coal research, 8:32941 (R;US)
Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R;US)
USDOE Morgantown Energy Technology Center, WV
Fixed-bed gasification, 8:32953 (R;US)
USDOE Office of Energy Research, Washington, DC. Energy Research Advisory Board
Magnetic-fusion program, 8:34893 (R;US)
Report of the Energy Research Advisory Board Direct Heat Subpanel of the Geothermal Panel, 8:33551 (R;US)
Report of the Energy Research Advisory Board Geopressured Resources Subpanel of the Geothermal Panel, 8:33550 (R;US)
Report of the Energy Research Advisory Board on hot dry rock, 8:33564 (R;US)
Report of the Energy Research Advisory Board on the relationship between the University of California and the Los Alamos Scientific and the Lawrence Livermore Laboratories, 8:34953 (R;US)
Report of the Energy Research Advisory Board study group to evaluate the proposed Coal-Gasification Multi-Test Facility, 8:32956 (R;US)
Report on biomass energy, 8:33322 (R;US)
Strategic Petroleum Reserve and brine-disposal problem, 8:33157 (R;US)
USDOE Office of Inspector General, Washington, DC
Sick leave administration, 8:33787 (R;US)
USDOE Office of Policy, Planning and Analysis, Washington, DC
Supplemental analysis of natural-gas-consumer regulatory-reform legislation, 8:33163 (R;US)
USDOE Savannah River Operations Office, Aiken, SC
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R;US)

V

Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)
Assessment of the creep damage and residual life of steam pipings, 8:33973 (R;FI;FI)
Drying of peat and wood biomass. Literature review, 8:33357 (R;FI;In Finnish)
Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R;US)
Energy research in the mechanical forest industry 1980-1982. Energy consumption in product transport, 8:33928 (R;FI;In Finnish)
Leak location in district heating networks using acoustical correlation techniques, 8:33943 (R;FI;In Finnish)
Utilization and processing of forest energy. Part 6. Properties and grinding of fast growing wood, 8:33358 (R;FI;In Finnish)
Vereinigung Schweizerischer Beratender Ingenieur- und Architektur-Gesellschaften (USGI), Zurich
Energy concepts for office buildings, 8:33898 (R;CH)
Versuchsgrubengesellschaft m.b.H., Dortmund (Germany, F.R.). Versuchsgrube Tremonia
VG annual report 1981, 8:33099 (R;DE;In German)
Vetenskapsakademin, Stockholm (Sweden). Beijerinstitutet
Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane., 8:33351 (R;SE)

Energy provision for the Seychelles. Producer gas and other opportunities, 8:33877 (R;SE)
Policy issues in Ethiopian energy development, 8:33320 (R;SE)
Workplan for an analysis of the fuelwood cycle in Kenya and the feasiility of expanded fuelwood production, 8:33350 (R;SE)
Vienna Univ. (Austria). Inst. fuer Experimentalphysik
Project "usage of hydrogen for purposes of energy technology", 8:33263 (R;AT;In German)
Virginia Polytechnic Inst., Blacksburg (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)
Virginia State Coll., Petersburg (USA)
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)
Vrije Univ., Amsterdam (Netherlands)
Spin polarization effects in low-energy elastic electron scattering, 8:34723 (R;NL)

W

Washington State Univ., Pullman (USA). Dept. of Chemical Engineering
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R;US)
Washington Univ., Seattle (USA). Dept. of Physics
Non-empty universe, 8:34680 (R;US)
Quark fragmentation and the determination of α/sub s/, 8:34756 (R;US)
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R;US)
Washington Univ., Seattle (USA). Nuclear Physics Lab.
Elastic and inelastic scattering of polarized protons from ^{208}Pb near isobaric analog resonances, 8:34834 (R;US)
Half-life of ^{138}La, 8:34822 (R;US)
Proton capture to excited states of ^{16}O; Ml, El and Gamow-Teller transitions and shell-model calculations, 8:34799 (R;US)
Westinghouse Electric Corp., Madison, PA (USA)
Fluidized-bed design for ICF reactor blankets using solid-lithium compounds, 8:34914 (R;US)
Westinghouse Electric Corp., Madison, PA (USA). Advanced Energy Systems Div.
First-wall-coating candidates for ICF reactor chambers using dry-wall protection only, 8:34913 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Reactors Div.
Fusion-breeder-reactor design studies, 8:34949 (R;US)
West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R;US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R;US)
West Virginia Univ., Morgantown (USA). Dept. of Geology and Geography
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R;US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R;US)
West Virginia Univ., Morgantown (USA). Dept. of Industrial Engineering
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R;US)
Wisconsin Univ., Madison (USA)
Annealing studies of amorphous alloys, 8:34247 (R;US)
Wisconsin Univ., Madison (USA). Dept. of Physics
Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R;US)
Second Z in SO(10), 8:34766 (R;US)
Wissenschaftszentrum, Berlin (Germany, F.R.). Internationales Inst. fuer Umwelt und Gesellschaft
Formulation and implementation of air quality control programmes, 8:33801 (R;DE)
Wood for Fuel Project, Inc., New Paltz, NY (USA)
Thinning woodland with small tractors for fuelwood and forestry, 8:33352 (R;US)
Woven Structures, Inc., Compton, CA (USA)
Thermal insulation blanket material. Final Report, 8:34221 (R;US)
Wright State Univ., Dayton, OH (USA). Dept. of Chemistry
Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R;US)
Wuerzburg Univ. (Germany, F.R.)
Spondylarthritis Ankylopoietica and its treatment with thorium X. Follow-up examinations carried out on patients of the Orthopaedic University Clinics Wuerzburg (Universitaetsklinik Wuerzburg), 8:34529 (R;DE;In German)
Wyoming Geological Survey, Laramie (USA)
Review of reported tar-sand occurrences and recent projects in Wyoming, 8:33168 (R;US)

Z

Zentralverband der Elektrotechnischen Industrie e.V. (ZVEI), Frankfurt am Main (Germany, F.R.)
Energy report of the electrical industry, 8:33868 (R;DE;In German)

PERSONAL AUTHOR INDEX

Authors' surnames are indexed in the form appearing in the abstracted publication; given names are reduced to initials. Each author entry gives the publication title and the citation number. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes. For publications with multiple authors, an entry is provided for each author. Entries for the second and succeeding authors give references to the first author.

Because of problems involved in the mechanical preparation of this index, all accent marks are omitted. Changes in spelling introduced as a result of accent omission follow standard conventions.

A

Aaboe, E.H., *See* Stickney, B.L., 8:33433

Aanad, M.S., Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R;US)

Aardsma, G.E., Toronto isotrace facility, 8:34343 (BA;US)

Abbott, J.H., *See* Drehmel, D.C., 8:33050

Abbott, S., Mechanical design of a heavy-ion RFQ, 8:34271 (R;US)

Abdel-Fattah, A., *See* Abdel-Salam, M., 8:34735

Abdel-Kawy, A., *See* Adib, M., 8:34803

Abdel-Salam, M., dc and pulse components of positive corona current from two interacting needles in air, 8:34735 (RA;US)

Abdou, M., Demonstration tokamak power plant, 8:34921 (R;US)
See Jung, J., 8:34923

Abdou, M.A., INTOR impurity control and first wall system, 8:34910 (R;US)

Abed, E., Study of nonlinear oscillations due to exciter control using Hopf bifurcation, 8:33652 (R;US)
Study of nonlinear oscillations due to exciter control, 8:33657 (R;US)

Abramov, A.G., Optimization of dimensions of the accelerating resonator of an accelerating-storage complex, 8:34311 (RA;SU;In Russian)

Abrams, D.W., Passive solar performance fraction relative to the actual building, 8:33462 (J;US)

Achatz, M., *See* Mullaney, P.F., 8:34556

Ackerhalt, J.R., *See* Galbraith, H.W., 8:34117, 8:34189

Ackerman, J.P., *See* Krumpelt, M., 8:33882

Adamchuk, Yu.V., *See* Muradyan, G.V., 8:34837

Adamov, V.M., Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J;US)

Adams, J.E., Dynamical aspects of precursor state kinetics, 8:34128 (J;NL)

Adamson, G.L., *See* Kahlon, T.S., 8:34482
See Lindgren, F.T., 8:34057, 8:34058

Adelberger, E.G., *See* Snover, K.A., 8:34799

Adelman, H.M., Studies of implicit and explicit solution techniques in transient thermal analysis of structures, 8:34235 (R;US)

Adib, M., Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV, 8:34803 (J;US)

Adrados, C., *See* Ebbe, S., 8:34589

Advani, S.H., Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion, 8:32976 (RA;US)

Aeljaelne, M., Utilization and processing of forest energy. Part 6. Properties and grinding of fast growing wood, 8:33358 (R;FI;In Finnish)

Affatica, J.P., Calibration of and conversion charts for Matheson rotameters, 8:34387 (R;US)

Affolter, R.H., *See* Hatch, J.R., 8:33016

Agarwal, A.K., *See* Zielinski, R.E., 8:32998

Aharon-Shalom, E., *See* Williams, J.M., 8:34109

Ahlfeld, C.F., *See* Baumann, N.P., 8:33736

Ahling, B., Experimental firing with Brini, at Eksjoe, April 1981, 8:33278 (R;SE)

Ahluwalia, R.K., *See* Im, K.H., 8:33880

Ahner, P.F., Rawlins Test 2 data analysis, 8:32963 (RA;US)
See Behi, A.M., 8:33069
See Davis, B.E., 8:32971

Aiken, R. L., Evaluation of quantitative precision in high performance liquid chromatography, 8:34070 (J;US)

Ainsworth, E.J., Cataract production in mice by fractionated doses of ^{12}C particles or ^{60}Co gamma radiation, 8:34598 (RA;US)
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA;US)
Response of mouse marrow colony forming units (CFU-S) to heavy charged particles, 8:34599 (RA;US)
See Alpen, E.L., 8:34597

Aitken, D.W., Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting, 8:33499 (J;US)

Akeson, S.P., *See* Mel, H.C., 8:34496

Akesson, T., Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R;US)

Akins, R.E., Wakes of isolated Darrieus turbines, 8:33614 (R;US)

Akridge, J.M., *See* Benton, C.C., 8:33484
See Ruberg, K., 8:33534

Akulov, V.V., "Electron-5" high-voltage electron accelerator, 8:34265 (RA;SU;In Russian)

Al'bertinskij, B.I., *See* Akulov, V.V., 8:34265

Albanese, J.R., Geologic and hydrologic research at the Western New York Nuclear Service Center, West Valley, New York. Annual report, August 1981-July 1982, 8:34668 (R;US)

Albers, J., *See* Krauss, R.M., 8:34483

Albrecht, M., *See* Klein-Szanto, A.J.P., 8:34566

Albrektsson, A., Biomass of Scots pine (Pinus Sylvestris L.). Amount-development-methods for mensuration, 8:33355 (R;SE;In Swedish)

Albrow, M.G., *See* Akesson, T., 8:34748

Alburger, D.E., Search for new isotopes at Brookhaven, 8:34809 (J;US)

Alder, B.J., Simulation of polar and polarizable fluids, 8:34742 (J;US)

Alesso, H.P., Classifying the singularity in the deformation shape of the liquid-drop model, 8:34847 (J;IT)

Alexander, P.H., *See* Safar, Y., 8:34867

Alexander, W.G., *See* Burns, L.K., 8:32994

Alfimenkov, V.P., Thermal neutron capture cross section in deuterium, 8:34798 (J;US)

Alkhazov, I.D., *See* Adamov, V.M., 8:34845

Allais, L., *See* Vanwormhoudt, M.C., 8:33362

Allan, C., *See* Ebbe, S., 8:34589

Allen, A.O., *See* Arudi, R.L., 8:34118

Allen, C.D., *See* Joos, D.W., 8:33041

Allen, D., *See* Parkin, B., 8:33317

Allibone, T.E., Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA;US)
Negative polarity dc breakdown of rod/plane gaps up to 1 MV, as affected by protrusions from the plane, 8:33634 (RA;US)

Almehed, S., *See* Akesson, T., 8:34748

Almeida, J., Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R;DE)

Almloef, G., Bal 2 process, 8:33088 (R;SE;In Swedish)

Aloia, J.F., *See* Cohn, S.H., 8:34512

Alonso, J., *See* Gough, R., 8:34317

Alpen, E.L., Induction of Harderian gland tumors in mice by heavy ion irradiation, 8:34597 (RA;US)
See Chatterjee, A., 8:34551
See Fabrikant, J.I., 8:34591
See Pennathur-Das, R., 8:34477
See Rodriguez, A., 8:34596
Althoff, K.H., *See* Meyer, W., 8:34304
Altner, G., Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission, 8:33847 (R;DE;In German)
Alton, G.D., *See* Compton, R.N., 8:34729
Alward, R., *See* Hamilton, B., 8:33414
Amaldi, E., *See* Dell, G.F., 8:34754
Ambrosius, G., Improvement of reactor physics design methods for plutonium recycling in boiling water reactors, 8:33663 (R;DE;In German)
Amendola, A.A., *See* Hughes, R.T., 8:34632
Ames, K.R., *See* Rankin, W.L., 8:33730
Aminpour, M., Thermal reactor analysis for PWR fuel assemblies containing control rods, 8:33671 (RA;IL)
Thermal reactor analysis for cluster geometries, 8:33717 (RA;IL)
Amos, A.T., *See* Yoffe, J.A., 8:34733
Anania, G., Application of the stellarator expansion for plasma-stability studies in stellarators, 8:34905 (R;US)
Andelfinger, C., Remotely handled vacuum flange connections, 8:34927 (R;DE;In German)
Andersen, J.A., Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:34223 (R;US)
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:33256 (R;US)
Quality assurance in packaging design through the peer review process, 8:34224 (R;US)
Anderson, B., *See* Place, W., 8:33894
Anderson, B.D., *See* Schimmerling, W., 8:34194
Anderson, G.L., Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982, 8:32952 (R;US)
Anderson, N.G., *See* Tollaksen, S.L., 8:34175
Anderson, R.P., Improving coal-liquid quality by heavy-distillate recycle, 8:32945 (R;US)
Anderson, S.L., *See* Albanese, J.R., 8:34668
Anderson, W.E., MCC stress-corrosion-cracking rate tension test method (MCC-104S), 8:33967 (R;US)
Andersson, B., M.E.P.A.: micro-computer erergy programs for architects, 8:33454 (J;US)
Andersson, L., *See* Karlsson, O., 8:33335
Ando, J., SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan, 8:33035 (RA;US)
Andrews, H.R., Chalk River accelerator dating facility, 8:34342 (BA;US)
Andrews, J.W., Worldwide applications of ground-coupled heat pumps, conventional and solar assisted, 8:33890 (R;US)
Andrienko, V.B., X-ray fluorescence analysis using crystal-diffraction spectrometer with proton excitation, 8:34538 (RA;SU;In Russian)
Andron, S.R., Not everyone's a scientist - not everyone's a bureaucrat, 8:33494 (J;US)
Ang, D., *See* Gold, L.S., 8:34620
Angelici, R.J., *See* Pickering, R.A., 8:34107
Anguet, J., *See* Diguet, D., 8:33323
Anis, H., Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing, 8:33642 (RA;US)
Anisovich, K.V., *See* Andrienko, V.B., 8:34538
Antony, K.C., *See* Fiore, N.F., 8:34003
Anufriev, V.A., Measurement of the total Nd-145 neutron cross section, 8:34829 (J;US)
Resonance parameters of Nd-147 (T/sub 1/2/ = 11ds) isotope neutron levels, 8:34830 (J;US)
Aoshima, Y., *See* Fujinami, H., 8:33646
Aoyagi, H., *See* Honda, M., 8:34014
See Ishikawa, M., 8:34033
Apol, A.G., Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R;US)
Appelman, E.H., *See* Steele, W.V., 8:33277
See Williams, J.M., 8:34109
Appleton, G., *See* Whitaker, R., 8:33812
Arasteh, D., Energy conservation and solar retrofit analysis of a large office building, 8:33913 (J;US)
Argon, A.S., Mechanics and mechanisms of intergranular cavitation in creeping alloys, 8:33995 (BA;NL)
Arifov, P.U., Emission spectrum of a positron source on the base of ^{22}Na, 8:34536 (RA;SU;In Russian)
Arinze, E.A., *See* Schoenau, G.J., 8:33523
Arlt, R., Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J;US)
Armbruster, P., *See* Hoffman, S., 8:33219
Armstrong, F.E., *See* Wohl, C.G., 8:34750
Arnoth, D.E., Evaluation of the Los Alamos Scientific Laboratory's residential passive solar methods applied to small commercial buildings, 8:33464 (J;US)
Arola, R.A., Harvesting wood for energy, 8:33356 (R;US)
Aronson, S., Detecting heavy flavors at CBA, 8:34747 (R;US)
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R;US)
Arthur, A.A., *See* Goldberg, D.A., 8:34285
Artomonov, V.S., *See* Anufriev, V.A., 8:34830
See Babich, S.I., 8:34841
Arudi, R.L., Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J;NL)
Arzigian, J.S., Aluminum electromigration lifetime variations with linewidth: the effects of changing stress conditions, 8:34248 (R;US)
Asada, Y., Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA;US)
Aschwanden, T., Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_6F_6), 8:34699 (RA;US)
Asphahani, A.I., *See* Silence, W.L., 8:33960
Atkins, J.M., Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA;US)
See Reed, C.W., 8:33648
Atkinson, B.A., Validation of CALPAS3 computer simulation program, 8:33465 (J;US)
Aubert, B., Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report, 8:33361 (R;XE;FR)
Auerbach, S.I., Role of environment, 8:34424 (R;US)
Auerkari, P., Assessment of the creep damage and residual life of steam pipings, 8:33973 (R;FI;FI)
Aussenac, G., *See* Meriaux, S., 8:33308
Austin, W.L., *See* Dutta, S.K., 8:34565
Auvray, X., Study of Cu-Be alloys in the vicinity of the eutectoid composition, 8:33999 (TG;US)
Avasthi, J.M., *See* Garon, A.M., 8:32965
Averdiek, W., *See* Frese, E., 8:34216
Axton, E.J., *See* Ryves, T.B., 8:34818
Ayer, F.A., Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R;US)
Azuma, T., Low energy behavior of a quantized scalar field in the linearly expanding universe, 8:34786 (R;JP)

B

Babcock, C.D., *See* Baker, W.E., 8:33748
Babenkov, M.I., Intensities of Auger KL L transitions in $_{78}^{194}Pt$, 8:34724 (RA;SU;In Russian)
Babich, S.I., Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J;US)
See Anufriev, V.A., 8:34829, 8:34830
Back, B.B., Quasi-fission, 8:34835 (R;US)
Back, N.L., Elastic and inelastic scattering of polarized protons from ^{208}Pb near isobaric analog resonances, 8:34834 (R;US)
Backman, G., *See* Gold, L.S., 8:34620
Badanes, S., Jersey Devil architecture: there's more to it than a low utility bill, 8:33509 (J;US)
Badovskij, V.P., *See* Pasechnik, M.V., 8:34537
Baert, D.H.J., *See* Vanwormhoudt, M.C., 8:33362
Bailey, G., *See* Nicklas, M., 8:33491
Bainbridge, D.A., Integral passive solar water heater performance, 8:33435 (J;US)
Bainum, D., *See* Yamanouti, Y., 8:34813
Bakalov, T., Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J;US)
Baker, C., *See* Abdou, M., 8:34921
Baker, C.L., Prediction of long-term impact of PGDP chromate sludge lagoon discharge, 8:34450 (RA;US)

Baker, D., Health Hazard Evaluation Report No. HHA-80-238-931, new York Port Authority, Brooklyn, New York, 8:34630 (R;US)
Baker, D.B., *See* Thun, M.J., 8:34603
Baker, W.E., Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R;US)
Bakker, W.T., Wear of refractories in slagging gasifiers, 8:34004 (BA;US)
Baktash, C., Transition from collective to noncollective rotation at high spin in N ≃ 87 nuclei, 8:34831 (R;US)
Balasco, A.A., *See* Santhanam, C.J., 8:33061
Balch, J.W., Developing a gate-array capability at a research and development laboratory, 8:34251 (R;US)
Balcomb, J.D., Heat storage and distribution inside passive-solar buildings, 8:33407 (R;US)
Passive research and practice, 8:33406 (R;US)
Balcomb, S.A., Impact of consumer/client issues on passive solar design, 8:33474 (J;US)
Baldo, G., Air insulation behaviour under oscillating impulses, 8:33631 (RA;US)
Ball, G.C., *See* Andrews, H.R., 8:34342
Ball, S.J., High-temperature gas-cooled-reactor safety studies for the Division of Accident Evaluation. Quarterly progress report, July 1-September 30, 1982. Volume 3, 8:33760 (R;US)
Balzer, R., Another version of a negative ion sputter source, 8:34347 (BA;US)
Bamberger, C.E., Thermal decomposition of trans-dibromotetraaquovanadium(III) bromide, $[VBr_2(H_2O)_4]Br.2H_2O$, 8:34108 (J;CH)
Ban, S., Rationale for domestic synthetic fuel alternatives, 8:33098 (RA;US)
Bandy, R., *See* Newman, R.C., 8:33668, 8:33955
Banoczy, J., *See* Klein-Szanto, A.J.P., 8:34566
Baratta, A.J., Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982, 8:33742 (R;US)
Barclay, J.A., Theory of an active magnetic regenerative refrigerator, 8:34220 (R;US)
Bard, L.A., *See* Geisheker, P.J., 8:33441
Barghe-Sharghi, V., *See* Ebbe, S., 8:34589
Bargheer, K.W., Roentgenologic examinations on the larynx of the horse, 8:34515 (R;DE;In German)
Baria, D.N., Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R;US)
Barlett, R.H., Projectile-power-compressed magnetic-field pulse generator, 8:34950 (R;US)
Barnaby, C.S., *See* Atkinson, B.A., 8:33465
Barnes, L.W., *See* Mehrhoff, T.K., 8:33262
Barnes, R.M., Inductively coupled plasma atomic emission spectroscopy: a review, 8:34080 (J;US)
Baron, E., *See* Frick, G., 8:34340
Barron, J.J., Portfolio of passive solar homes designed, constructed and marketed by New York State Builders/Developers, 8:33490 (J;US)
See Niles, J.E., 8:33527
Bartal, Y., Assembly homogenization in TDB, 8:33715 (RA;IL)
Comparison calculations with various versions of the LEOPARD codes, 8:33716 (RA;IL)
Iterative methods in diffusion calculations, 8:33714 (RA;IL)
Bartel, L.C., Site characterization: geophysical R and D needs, 8:32986 (RA;US)
Bartelsen, H., *See* Meissner, R., 8:33554
Barthel, V., Wave motion in an estuary, 8:33578 (R;DE;In German)
Barthell, B.L., *See* Duchane, D.V., 8:33962
Bartholly, H., Development of large thrusters for dynamic positioning of OTEC systems, 8:33382 (RA;US)
Bartke, T.C., *See* Owen, T.E., 8:33101
Bartley, J.C., Benzo(a)pyrene metabolism in human mammary epithelial cells, 8:34622 (RA;US)
See Stampfer, M.R., 8:34497, 8:34621
Bartos, S., *See* Loftness, V., 8:33476
Bartucca, F., *See* Yamazaki, A., 8:34488
Bastien, F., Dielectric strength of electronegative gases in non-uniform field: role of the vibrational excitation, 8:34736 (RA;US)
Bates, J.K., *See* Steindler, M.J., 8:33189, 8:33190
Bather, J.M., Chemical exploration by computer, 8:33103 (J;GB)
Batzinger, R., *See* Legator, M.S., 8:34640
Bauer, H., *See* Caldwell, M.M., 8:34575
Bauer, L., Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80, 8:34571 (R;US)
Bauer, M.L., Evaluation of fiber optics for in-line photometry in hostile environments, 8:33185 (J;US)
Bauman, F., *See* Place, W., 8:33894
Baumann, N.P., Reactivity monitoring during reactor-reloading operations, 8:33736 (R;US)
Baumgaertner, H., Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal, 8:33707 (R;DE;In German)
Baybutt, P., The treatment of uncertainties in risk for regulatory decision making, 8:33819 (BA;US)
Bayen, F., Localizability of massless particles in the framework of the conformal group, 8:34891 (R;XA)
Bayle, M., *See* Maurel, J., 8:34701
Bayle, P., *See* Maurel, J., 8:34701
Bazan, F., Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R;US)
Beauchamp, J.J., *See* Cox, D.K., 8:34611
Beaudry, B.J., *See* Ito, T., 8:34001
Beavers, J.A., *See* Koch, G.H., 8:33028
Bebout, R.A., UCG test facility design criteria and evaluation, 8:32964 (RA;US)
Becher, J., *See* Smith, L.C., 8:34246
Becker, W.S., Making of a solar village, 8:33310 (J;US)
Beckervordersandforth, C.P., *See* Ledent, P., 8:32975
Beckman, W.A., F-load: a building heating load calculation program, 8:33452 (J;US)
See Erbs, D.G., 8:33470
See Klein, S.A., 8:33460
Bedford, A., *See* Drumheller, D.S., 8:34145
Beer, H., Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J;US)
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J;US)
Beer, J., *See* Balzer, R., 8:34347
Beer, S., Measuring chlorophyll a and ^{14}C-labeled photosynthate in aquatic angiosperms by the use of a tissue solubilizer, 8:34491 (J;US)
Photosynthetic carbon metabolism in the submerged aquatic angiosperm Scirpus subterminalis, 8:34510 (J;NL)
Beerlage, M.J.M., Spin polarization effects in low-energy elastic electron scattering, 8:34723 (R;NL)
Beeson, R.J., *See* Siegel, M.M., 8:32974
Begun, G.M., *See* Smith, D.H., 8:34134
Behi, A.M., Effect of UCG on groundwater: a study of cavity and surrounding groundwater, 8:33069 (RA;US)
Beitner, M., Microelectronic temperature sensor; silicon temperature sensor, 8:34385 (R;DE;In German)
Bejshovets, V., Present status of the isochronous cyclotron of Czechoslovak Academy of Sciences, 8:34268 (RA;SU;In Russian)
Belanova, T.S., *See* Babich, S.I., 8:34841
Bell, R.E., *See* Marina, J., 8:33394
Belouet, C., Deposit of polycrystalline layers of silicon on a conducting substrate, beginning with the liquid phase. Final report, 8:33326 (R;XE;FR)
Ben-Zvi, I., Rehovot 14UD Pelletron: status report, 8:34331 (BA;US)
Bencini, J.F., *See* Ahner, P.F., 8:32963
Bender, M.A., Role of base damage in aberration formation: interaction of aphidicolin and x-rays, 8:34607 (BA;US)
Bendixen, L.M., *See* Croce, P.A., 8:33165
Benedict, U., *See* Peterson, J.R., 8:33958
Beneventano, M., *See* Dell, G.F., 8:34754
Benford, S.M., Erosion/corrosion of superalloy test coupons exposed to PFB coal combuster effluent, 8:33982 (BA;US)
Bengoa, B.J., *See* Whinnery, W.N., 8:33018
Benjamin, A.S., Risk assessment of filtered-vented containment options for a BWR Mark I containment, 8:33774 (BA;US)
Benjamin, R.W., Alternatives for defense waste-salt disposal, 8:33206 (R;US)
Benner, R.E., *See* Truhan, J.J., 8:33971
Bennett, D.E., Allowable shipment frequencies for the transport of toxic gases near nuclear power plants, 8:33757 (R;US)

Bennett, J.G., *See* Baker, W.E., 8:33748
Beno, M.A., *See* Williams, J.M., 8:34109
Bentley, J., Ab initio calculation of the structures and properties of some lithium-Lewis base complexes, 8:34126 (J;US)
See Sklad, P.S., 8:34075
Benton, C.C., Laboratory experiments in building climatology, 8:33484 (J;US)
See Ruberg, K., 8:33534
Benton, E.V., *See* Fabrikant, J.I., 8:34550
Berg, B., *See* Newcomb, C., 8:33447
See Staaf, H., 8:33345
Bergendahl, L., Wave power buoys. Model tests of energy absorption on irregular waves in a broad tank, 8:33579 (R;SE;In Swedish)
Berger, G., Time lags in SF_6 under impulse conditions, 8:34028 (RA;US)
Bergeson, D.E., Performance studies of passive solar applications in the mid-west using blast, a large hourly calculation computer-based simulation program, 8:33449 (J;US)
Bergkamp, M.A., Temperature dependence of the lifetimes of the ligand-field states of tris(1,10-phenanthroline)iron(II), 8:34183 (J;NL)
Bering, D.E., *See* Shectman, R.M., 8:34252
Bern, T.I., Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R;NO)
Bernard, E.C., Criconematina (nematoda: tylenchida) from the Aleutian Islands, 8:34437 (J;US)
Three new species of heteroderoidea (nematoda) from the Aleutian Islands, 8:34438 (J;US)
Bernstine, E.G., *See* Russell, L.B., 8:34505
Berry, F.O., *See* Anderson, G.L., 8:32952
Bertilsson, B.M., Determination of methyl nitrite in automobile exhaust gases, 8:33276 (R;SE;In Swedish)
Bertinelli, F., *See* Wormley, D.N., 8:33396
Besant, R.W., *See* Schoenau, G.J., 8:33523, 8:33906
Bespalov, D.F., Development and investigation of small-sized unsoldered accelerating tubes for a neutron laser generator, 8:34310 (RA;SU;In Russian)
Bethel, R.A., *See* Nadel, J.A., 8:34631
Betts, J.M., *See* Gershunov, E.M., 8:33400
Betts, R.R., Resonances in heavy systems, 8:34806 (R;US)
Beukens, R.P., *See* Aardsma, G.E., 8:34343
Bhaskaran, K.A., *See* Natarajan, K., 8:33274
Bhat, B.N., *See* Gelles, S.H., 8:34740
Bhattacharya, R.S., Damage annealing behavior of Se implanted GaAs, 8:34045 (J;GB)
Bhattacherjee, A.P., Phase stability and microstructural characteristics of bulk glassy CdGe/sub 1-x/Si/sub x/As_2 alloys, 8:34047 (J;GB)
Biasin, K., Efficient energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Final report. Pt. A, 8:33409 (R;DE;In German)
Biasiutti, G., Homogeneous field breakdown strength characteristics of some dielectric gases, 8:34026 (RA;US)
Bibler, N.E., Gas production from alpha radiolysis of concrete containing TRU incinerator ash. Progress report 2, August 1-November 30, 1978, 8:34043 (R;US)
Bidani, M., *See* Lifshitz, A., 8:34088
Bielski, B.H.J., *See* Arudi, R.L., 8:34118
Bienstock, D., *See* Spencer, F.E. Jr., 8:33878
Biggers, J.V., Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R;US)
Biggs, R.H., Field trials with soybeans, rice and wheat under UV-B irradiances simulating several O_3 depletion levels, 8:34647 (RA;DE)
UV-B radiation transmitting greenhouse for plant studies, 8:34651 (RA;DE)
Bigsby, F.W., *See* Schoenau, G.J., 8:33523
Billing, H., *See* Ruediger, A., 8:34882
Billquist, P.J., *See* Kutschera, W., 8:34819
Bingham, J.M., *See* MacInnes, M.A., 8:34494
Biolchini, R.J., *See* Francis, D.V., 8:33032
Bircher, T.L., Revised renewable resource calculation procedures for the RCS program, 8:33410 (R;US)
Birk, M., *See* Ben-Zvi, I., 8:34331
Birkel, I., *See* Peterson, J.R., 8:33958
Birks, N., Mechanism of corrosion in multiple component gases at high temperatures, 8:33977 (BA;US)
Birnbreier, H., Absorption heat pump for heating small residential buildings, 8:33888 (R;DE;In German)
Bishop, S., *See* Hanson, R.B., 8:34509
Bisognano, J., Stochastic cooling: recent theoretical directions, 8:34291 (R;US)
Threshold behavior for longitudinal stability of induction linac bunches, 8:34283 (R;US)
Bissell, E.R., Synthesis of three [(trifluoroethyl)amino]pyridines, 8:34166 (J;US)
Bissell, M.J., *See* Dolberg, D.S., 8:34560
See Karczmar, G.S., 8:34506
See Parry, G., 8:34498
Bitensky, M.W., Functional exchange of components between light-activated photoreceptor phosphodiesterase and hormone-activated adenylate cyclase systems, 8:34487 (J;US)
See Yamazaki, A., 8:34488
Bixler, N.E., *See* Martinez, M.J., 8:33245
Bjelm, L., Geothermal energy extraction in Skaane. Final report, stage 4, 8:33552 (R;SE;In Swedish)
Bjornstad, K., *See* Esposito, M.S., 8:34504
Blair, D.T.A., *See* Crichton, B.H., 8:34022
Blake, T.R., *See* Jones, M.S. Jr., 8:33373
Blakely, E.A., *See* Tobias, C.A., 8:34594
Blanch, H.W., *See* Mancuso, A., 8:33275
Blanche, P.J., *See* Nichols, A.V., 8:34485
Blander, M., *See* Curtiss, L.A., 8:34143
See Saboungi, M.L., 8:33013
Blankenhorn, R., Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel, 8:33879 (R;DE;In German)
Blanton, J., *See* Fisher, H., 8:33572
Blatt, S., *See* Leipuner, L.B., 8:34322
Blazejowski, J., 147-nm photolysis of phosphine-silane mixtures, 8:34190 (J;CH)
Bleicher, S.A., Impact of the OTEC Act of 1980 on OTEC operations outside US waters, 8:33307 (RA;US)
Blink, J.A., Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R;US)
Block, D., *See* McCluney, R., 8:33305
Blokhin, V.F., *See* Zajtsev, M.G., 8:34542
Blomquist, N.H., *See* Nelson, J.K., 8:34734
Bloomstran, M.A., *See* Ahner, P.F., 8:32963
Bluestein, J., *See* Manley, R., 8:33290
Blum, C.B., *See* Forte, T.M., 8:34552
Blythe, G.M., EPRI spray drying pilot plant status and results, 8:33046 (RA;US)
Bobykin, B.V., *See* Babenkov, M.I., 8:34724
Bodin, S., Wind forecasting and some other aspects of wind information relevant to integration of WECS in the grid, 8:33596 (RA;DE)
Bodle, W.W., Liquid fuels from the hydropyrolysis of biomass, 8:33268 (J;US)
Boeckhoff, K.H., *See* Salome, J.M., 8:34351
Boegly, W.J. Jr., *See* Tamura, T., 8:33228
Boekema, C., *See* Schillaci, M.E., 8:34865
Boernke, W.E., Differential changes in ornithine aminotransferase self-affinity produced by exposure to basic amino acids and increases in the intrinsic electronegativity of the enzyme monomer, 8:34147 (J;US)
Boese, F.K., *See* Loftness, V., 8:33476, 8:33512
Boesl, F., Clinical relevance of radioimmunologic gastrin determination for peptic ulcer, 8:34530 (R;DE;In German)
Boettcher, H., *See* Aschwanden, T., 8:34699
Boettcher, K.L., *See* Levis, A.H., 8:34476
Bogenrieder, A., Action spectra for the depression of photosynthesis by UV irradiation in Lactuca sativa L. and Rumex alpinus L., 8:34653 (RA;DE)
Effect of UV on photosynthesis and growth in dependence of mineral nutrition (Lactuca sativa L. and Rumex alpinus L.), 8:34657 (RA;DE)
Boger, Z., Radioactive waste disposal options for the operation of nuclear power stations, 8:33216 (RA;IL)
Boggs, S.A., Wideband digital correlator for partial discharge location in GIS, 8:33641 (RA;US)
Bogner, J.E., *See* Henning, R.J., 8:33071
Bohachevsky, I.O., Modeling and analysis of inertial-confinement-fusion facilities, 8:34931 (R;US)
Bohn, H., *See* Ulrich, A., 8:34228
Bolden, P., *See* Singer, M.E., 8:33115
Boley, C.D., Charge state of sputtered impurity ions near a limiter or divertor in a tokamak, 8:34909 (R;US)
Bollinger, L.M., Argonne Tandem-Linac Accelerator System, 8:34307 (R;US)
Bollini, C.G., Gauge fields and unifying ideas, 8:34778 (RA;BR)
Bolme, B.M., *See* Tsongas, G.A., 8:33457
Bonani, G., *See* Balzer, R., 8:34347
Bondietti, E.A., Toxic substances program, 8:34453 (RA;US)
Bonte, L., *See* Vanwormhoudt, M.C., 8:33362
Boone, L.R., *See* Tennant, R.W., 8:34572
Borchardt, D.R., Capabilities and potential of the SS Ocean Energy Converter as

an ocean test facility, 8:33389 (RA;US)
Borgia, B., *See* Dell, G.F., 8:34754
Borkowski, R.J., In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R;US)
Bortnik, I.M., SF_6 thermophysical properties: engineering approach, 8:34041 (RA;US)
Borzakov, S.B., *See* Alfimenkov, V.P., 8:34798
Boscher, J., *See* Dumpert, K., 8:34650
Bosma, J., Wave kinematics and fluid loading in irregular waves, 8:34679 (R;US)
Bostick, D.T., *See* Bauer, M.L., 8:33185
Bougnot, J., *See* Vedel, J., 8:33324
Boushey, H.A., *See* Nadel, J.A., 8:34631
Bowman, C.D., Efficient neutron production using low energy electron beams, 8:34350 (J;US)
Perturbations of nuclear cross sections associated with changes in molecular vibrational energy, 8:34836 (J;US)
See Fowler, J.L., 8:34794
Bowman, K.O., Explicit approximate solutions for S/sub B/, 8:34976 (J;US)
Moment series for the coefficient of variation in Weibull sampling, 8:34978 (BA;US)
Boyd, T.J., *See* Owen, R.K., 8:34282
Boyer, L.L., *See* Grondzik, W.T., 8:33918
Brakestad, H., Risk analysis, gas and oil leakages, 8:33143 (R;NO)
Brand, K., Intense low energy heavy ion beams from a tandem dynamitron, Part II, 8:34345 (BA;US)
Brandberg, Aa., Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R;SE;In Swedish)
Brandell, L., *See* Gerholm, T.R., 8:33794
Brandhorst, H.W., Jr., *See* Weinberg, I., 8:33330
Brandt, OE., *See* Jakobsen, J.I., 8:33145
Branstetter, L.J., Numerical studies of laboratory triaxial creep tests, 8:34673 (R;US)
Braunstein, J., *See* Vallet, C.E., 8:33783
Breault, R.W., *See* Mathur, V.K., 8:32999
Brecher, G., Marrow transfusions into normal recipients, 8:34478 (RA;US)
Breitbach, G., Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger, 8:33708 (R;DE;In German)
Breuer, G.M., Evaluation of a prototype portable microwave multi-gas analyzer. Technical report, 8:34405 (R;US)
Brewer, D.J., Solar access laws can benefit developers, 8:33316 (J;US)
Brewer, W.D., *See* Southworth, S., 8:34181
Brickell, E.F., Are most low-density knapsacks solvable in polynomial time, 8:34966 (R;US)
Brimer, P.A., Effect of metabolic activation on the cytotoxicity and mutagenicity of 1,2-dibromoethane in the CHO/HGPRT system, 8:34639 (J;NL)
Brimhall, R.M., Results and postburn evaluation of TAMU's 1980 ULG field test in east Texas lignite, Rockdale site, 8:32969 (RA;US)
Brines, H.G., *See* Muzio, L.J., 8:33047
Brink, G.O., *See* Lewellen, L.R., 8:34728
Britten, J.A., Modeling studies of reverse combustion linking at high pressure, 8:32992 (RA;US)
Brittingham, J.N., *See* Burke, G.J., 8:34887
Brixner, B., Accelerating convergence in automatic lens design, 8:34885 (J;US)
Brna, T.G., *See* Kelly, M.E., 8:33044
See Samuel, E.A., 8:33045
Broadhurst, J.H., Some problems associated with the use of small scale measurements in determining the dielectric strength of insulating gases, 8:34050 (BA;US)
Brobst, R.P., *See* McCarron, R.L., 8:33094
See Spriggs, D.R., 8:33007
Brodsky, S.J., Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R;US)
Broerse, J.J., Fast neutron radiotherapy: fundamental aspects and clinical results, 8:34558 (J;US)
Brogden, I., Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R;US)
Bromley, D.A., Why higher energies, 8:34349 (BA;US)
Brommer, M., Sonography and computerized tomography in a comparison in renal mass diseases, 8:34528 (R;DE;In German)
Brookhart, K., *See* Bamberger, C.E., 8:34108
Brooks, J., *See* Abdou, M., 8:34921
Brooks, J.N., *See* Boley, C.D., 8:34909
Brotzman, R.W., Volume dependence of the elastic equation of state. 2. Solution-cured poly(dimethylsiloxane), 8:34156 (J;US)
Brown, A., *See* McCluney, R., 8:33305
Brown, B.A., *See* Snover, K.A., 8:34799
Brown, G.Z., Design methodology based on climate characteristics, 8:33467 (J;US)
See Ubbelohde, M.S., 8:33483
Brown, M.J., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
Brown, R., Material loss and ripple formation during solid particle erosion at 30° impact angles, 8:33983 (BA;US)
Brown, R.M., *See* Andrews, H.R., 8:34342
Brownson, D.A., *See* Baratta, A.J., 8:33742
Brubaker, I.M., Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R;US)
Bruck, N.G., *See* Laseke, B.A. Jr., 8:33024
Bruggink, P.R., Economic comparison for UCG processes, 8:32972 (RA;US)
Brunschwig, B.S., *See* Bergkamp, M.A., 8:34183
Brunzell, J., *See* Krauss, R.M., 8:34483
Bruschi, C.V., *See* Esposito, M.S., 8:34504
Brusegan, A., Neutron capture cross section measurements of ^{56}Fe, 8:34815 (J;US)
Bryan, H., Use of physical scale model for daylighting analysis, 8:33920 (J;US)
Bryan, H.J., Development of a daylighting resourcebook and curriculum at Rensselaer Polytechnic Institute's School of Architecture, 8:33912 (J;US)
Bryant, D., *See* Grula, E.A., 8:33109
Bryant, F.C., *See* Hill, D., 8:33235
Brynestad, J., Incompatibility between the Kohler method and the subregular model, 8:34129 (J;GB)
Bubela, B., Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery, 8:33118 (RA;US)
Buchanan, M.V., Compositional changes in red and violet smoke mixes after combustion, 8:34396 (R;US)
Bucina, I., *See* Malatova, I., 8:34368
Budinger, T.F., Positron emission tomography: instrumentation perspectives, 8:34557 (B;US)
See Derenzo, S.E., 8:34378
See Friedland, R.P., 8:34543
See Huesman, R.H., 8:34546
See Richards, T., 8:34590
See Sargent, T. III, 8:34545
See Yano, Y., 8:34544
Budtz-Jorgensen, C., *See* Knitter, H.H., 8:34382
Budzanowski, A., *See* Stokstad, R.G., 8:34808
Bueding, E., *See* Legator, M.S., 8:34640
Bueker, H., Problems of non-proliferation and nuclear safeguards, 8:34470 (R;DE;In German)
Bufe, C.G., *See* Marks, S.M., 8:33553
Buhl, A.R., Three Mile Island, 8:33775 (J;US)
Bujdoso, E., Prompt nuclear analysis: growth and trends. A scientometric study, 8:34062 (J;CH)
Burd, W.C., Emulation of multi-axis numerically controlled machine tools, 8:34226 (R;US)
Burk, R.C., *See* Misra, B., 8:34917
Burke, G.J., Computer modeling of antennas near the ground, 8:34887 (J;US)
Burke, J.M., *See* Blythe, G.M., 8:33046
Burn, N., *See* Andrews, H.R., 8:34342
Burns, L.K., Application of geological and mineralogical studies to underground coal gasification technology, 8:32994 (RA;US)
Burrows, T.W., *See* Weil, J.L., 8:34805
Burton, J.W., Side by side comparison study of integral passive solar water heaters, 8:33434 (J;US)
Burwell, D., Mini-OTEC 2 program plan for electrochemical and synthetic fuels demonstration, 8:33388 (RA;US)
Burwell, R.L. Jr., *See* Nandi, R.K., 8:34094
Busbach, H., Thermo-elastoplastic material law for application of the finite element method to calculate thermal loads, 8:33965 (R;DE;In German)
Buschbach, T.C., New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R;US)
Bustamente, C., *See* Maestre, M.F., 8:34056
Butler, S.L., *See* Guerin, D.A., 8:33478
Butt, J.B., *See* Nandi, R.K., 8:34094
Buzbee, B., Distributed processors and intelligent workstations at Los Alamos, 8:34961 (R;US)
Buzbee, B.L., Japanese supercomputer technology, 8:34970 (J;US)
Bykovskij, Yu.A., *See* Bespalov, D.F., 8:34310

Byler, E., OTEC personnel consideration, 8:33395 (RA;US)
Byrne, S.J., Simulation programs as design tools: an optimization technique, 8:33453 (J;US)

C

Cacuci, D.G., *See* Yaari, A., 8:33710
Cahill, C.A., *See* Carter, R.P., 8:33164
Cahoon, J.L., *See* Budinger, T.F., 8:34557
See Derenzo, S.E., 8:34378
Caird, R.S., Circuit model for the explosive-driven plate generator, 8:34928 (R;US)
Cala, G.C., *See* Garon, A.M., 8:32965
Calderon, I.L., *See* Mortimer, R.K., 8:34502
Caldwell, M.M., Biological effects of UV-B radiation, 8:34575 (R;DE)
Geometrical considerations: a brief synopsis, 8:34654 (RA;DE)
Plant action spectra: some thoughts on development and use, 8:34646 (RA;DE)
UV-B sensitivity of plant photosynthesis as influenced by visible irradiation, 8:34652 (RA;DE)
Calthorpe, P., Between public and private: a new common ground, 8:33945 (J;US)
Roosevelt Parkside: low income passive solar housing, 8:33480 (J;US)
Calvin, M., *See* Wilner, I., 8:33261
Camarata, S.J. Jr., Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J;US)
Campbell, M., *See* Leipuner, L.B., 8:34322
Campillo, A.J., *See* Lin, H.B., 8:34077
Cannon, T.F., *See* Steindler, M.J., 8:33189, 8:33190
Cantor, J., *See* Daughton, C.G., 8:33172
Capelle, G.A., Aerial testing of KrF-laser-based fluorosensor, 8:34386 (R;US)
Capone, A., *See* Dell, G.F., 8:34754
Caporaso, G.J., *See* Prono, D.S., 8:34294
Capriotti, J.M., *See* Williams, J.M., 8:34109
Carlile, J.M.V., *See* Sula, M.J., 8:34418, 8:34427, 8:34428, 8:34429, 8:34430, 8:34431, 8:34435, 8:34456, 8:34458, 8:34459
Carlson, A.D., *See* Czirr, J.B., 8:34802
Carlson, D.C., Comparison of simulated to actual plutonium deposition at the Savannah River Plant, 8:34414 (R;US)
Carlson, J.H., Texas solar greenhouse '80 statewide program, 8:33487 (J;US)
Carlson, O., *See* Hylander, J., 8:33609
Carlson, R., Coal cleaning by physical methods prior to combustion, 8:33085 (R;SE;In Swedish)
Carlsson, I., *See* Eggwertz, S., 8:33607
Carlsson, O., Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system, 8:33602 (R;SE;In Swedish)
Carmichael, A.D., *See* Wormley, D.N., 8:33396
Carmichael, I., *See* Bentley, J., 8:34126
Carpenter, D., *See* Ebbe, S., 8:34589
Carpenter, J.M., *See* Kimura, M., 8:34866
Carr, B., *See* Connell, G.M., 8:34479
Carr, R.S., Performance assessment of a utility-sponsored passive solar home program, 8:33463 (J;US)
Carr, R.W. Jr., *See* Seigneur, C., 8:34151
See Suong, J.Y., 8:34182
Carrara, G., Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA;US)
Carreras, B.A., MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation, 8:34902 (R;US)
Carroll, H.B., *See* Fanchi, J.R., 8:33135
Carroll, H.F., *See* Lifshitz, A., 8:34088
Carroll, J.T., Data acquisition using the 168/E, 8:34321 (R;US)
Carroll, W., *See* Place, W., 8:33894
Carter, J., Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R;US)
Carter, J.A., *See* Smith, D.H., 8:34074
Carter, R.P., There's more to erosion control than protecting the pipe, 8:33164 (R;US)
Caspi, S., *See* Gilbert, W., 8:34319
Caspo, N., Validation of the three-dimensional code TRITON, 8:33713 (RA;IL)
Validation of the three-dimensional code TRITON, 8:33723 (RA;IL)
Castellano, C.C., Overall OTEC-1 status and accomplishments, 8:33398 (RA;US)
Casten, R.F., Unique parity states in ^{109}Pd as a test of particle-rotor and IBFA models, 8:34825 (BA;US)
Castleman, A.W. Jr., Studies of the formation and structure of homomolecular and heteromolecular clusters, 8:34127 (J;NL)
Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces, 8:34121 (J;US)
See Kay, B.D., 8:34120
Castro, J.R., Treatment of cancer with heavy charged particles, 8:34548 (RA;US)
Caswell, W.E., Particles and fields - 1982, 8:34744 (B;US)
Causey, A.R., *See* Cheadle, B.A., 8:33987
Cecil, F.E., Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers, 8:34381 (J;US)
See Len, L.K., 8:34804
Cecil, R.A., *See* Schimmerling, W., 8:34194
Cha, Y.S., *See* Cole, R.L., 8:33548
Chaiken, R.F., Controlled burnout at an abandoned coal mine fire, 8:33059 (RA;US)
Chakravorty, K.R., *See* Sen, S.P., 8:33273
See Singh, S.K., 8:33272
Chamberlain, C., *See* Hanson, R.B., 8:34509
Chambers, C.C., *See* Siegel, M.M., 8:32967
Chan, G.L., Introductory study of the economic factors favorable to an OTEC electric power generation station on Saipan, Commonwealth of the Northern Mariana Islands, 8:33293 (RA;US)
Chan, I.C., *See* Tong, Y.T., 8:33632
Chan, Y., *See* Stokstad, R.G., 8:34808
Chan, Y.N.I., *See* Chevray, R., 8:34239
Chanda, R., Weak interactions, 8:34760 (RA;BR)
Chandelle, V., *See* Ledent, P., 8:32975
Chandrasekaran, K., Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B;IN)
Chang, J.C.S., Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems, 8:33051 (RA;US)
Chang, K.H., *See* Aardsma, G.E., 8:34343
Chang, P.W., *See* Jang, L.K., 8:33110
Chang, P.Y., *See* Tobias, C.A., 8:34594
Chang, Y.W., *See* Ma, D.C., 8:33741
Chapman, C.C., *See* Siemens, D.H., 8:33232
Chapman, K.R., Status report on the cryogenic linear accelerator booster project at Florida State University, 8:34334 (BA;US)
Chapman, L.R., *See* Stanaland, V.A., 8:33974
Charvat, J., Energy dependence of some current personnel neutron dosemeters, 8:34366 (RA;CS;In Czech)
See Spurny, F., 8:34370
Chase, J.B., *See* Barlett, R.H., 8:34950
Chatterjee, A., Diagnostic studies with high energy radioactive beams, 8:34551 (RA;US)
Radiological physics and chemistry, 8:34195 (RA;US)
See Narasimha Murthy, K.H., 8:34850
Chatterton, P.A., Prebreakdown and breakdown processes in high vacuum accelerator tubes, 8:34336 (BA;US)
See Nelson, J.K., 8:34734
Chattopadhyay, S.K., Singlet-singlet absorption spectra of diphenylpolyenes, 8:34179 (J;NL)
Cheadle, B.A., High-strength, creep-resistant excel pressure tubes, 8:33987 (J;US)
Chen, B., Performance results of the Dennis Demmel double shell home, Hartington, Nebraska, 8:33424 (J;US)
Chen, C.T.A., *See* Marshall, W.L., 8:34100
Chen, G.T.Y., Radiotherapy physics, 8:34549 (RA;US)
See Castro, J.R., 8:34548
See Chatterjee, A., 8:34551
Chen, I.W., *See* Argon, A.S., 8:33995
Chen, L., *See* Goldstein, H., 8:34383
Chen, P.W., *See* Wen, C.Y., 8:33271
Chen, Y.C., *See* Tong, Y.T., 8:33632
Chen, Y.J., *See* Kaplan, S.M., 8:33048
Chen, Z., Cooling effect of night ventilation, 8:33535 (J;US)
Cheney, M.C., UTRC 15-kW wind-system development. Phase II: fabrication and testing, 8:33610 (R;US)
Cheng, H.C., Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R;US)
Cheng, K.T., Relativistic many-body theory of atomic structures, 8:34720 (R;US)
Cheng, W.H., Chemical properties of anion vacancies on zinc oxide, 8:34006 (J;NL)
Cheverton, R.D., *See* Sauter, A., 8:33765
Chevray, R., Dynamics of bubbles and entrained particles in the rotating fluidized bed, 8:34239 (J;US)

Chiang, T.C., Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J;GB)
Chigak, M., *See* Bejshovets, V., 8:34268
Child, W.C. Jr., *See* Smith, D.H., 8:34134
Chilukuri, R., Numerical computation of buoyancy-induced recirculation in curved square duct laminar flow, 8:34238 (J;GB)
Choi, C.K., *See* Galambos, J., 8:34925
Christiansen, P.A., Reliable static electric dipole polarizabilities for heavy elements, 8:34101 (J;NL)
See Ermler, W.C., 8:34119
See Pitzer, K.S., 8:34123
Christophorou, L.G., Gaseous dielectrics III, 8:34020 (R;US)
Negative ion states of polyatomic molecules, 8:34169 (J;US)
See Kourouklis, G.A., 8:34150
See Siomos, K., 8:34184, 8:34191
Chrostek, W.J., Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R;US)
Chu, F.Y., Thermal decomposition of SF_6 and SF_6-air mixtures in substation environments, 8:34038 (RA;US)
Chu, M.S., *See* Pepping, R.E., 8:33253, 8:33255
Chu, M.S.Y., *See* Siegel, M.D., 8:33254
Chupp, W., Quadrupole beam-transport experiment for heavy ions under extreme space charge conditions, 8:34284 (R;US)
Cittolin, S., *See* Carroll, J.T., 8:34321
Civinskas, K.C., *See* McLallin, K.L., 8:33948
Claar, T.D., *See* Anderson, G.L., 8:32952
Claeson, L., *See* Torsethaugen, K., 8:33581
Claesson, L., *See* Gerholm, T.R., 8:33794
Clapp, N.E. Jr., *See* Ball, S.J., 8:33760
Clark, B.A., Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations, 8:34854 (R;US)
Clark, D.J., ECR heavy-ion source for the LBL 88-inch cyclotron, 8:34320 (R;US)
Clark, J.B., *See* Donaldson, E.C., 8:33104
See Jenneman, G.E., 8:33111
Clark, J.C., Accelerators for radionuclide production, 8:33258 (J;US)
See Prono, D.S., 8:34294
Clark, L.L., RECON: a computer program for analyzing repository economics. Documentation and user's manual, 8:33188 (R;US)
Clark, M., Review of reported tar-sand occurrences and recent projects in Wyoming, 8:33168 (R;US)
Clements, D.W., Component reliability as experienced by manufacturer of electronic assemblies, 8:34241 (R;US)
Clemons, G.K., Thyroid hormone studies after ozone exposure, 8:34618 (RA;US)
See Webber, R.J., 8:34480
Cleveland, J.C., *See* Ball, S.J., 8:33760
Clikeman, F.M., *See* Koch, K.R., 8:33690
Clinard, F.W. Jr., Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R;US)
Cocke, C.L., Recoil ions: production and uses, 8:34713 (RA;US)
Coddens, G., *See* Wagemans, C., 8:34842
Coffey, N., *See* Warren, N., 8:33555, 8:33569, 8:33573, 8:33574, 8:33575, 8:33576
Coghlan, W.A., *See* Mansur, L.K., 8:33957
Cohen, J.B., *See* Nandi, R.K., 8:34094
Cohen, R., *See* Ebbe, S., 8:34589
Cohlmeyer, J.C., *See* McIntosh, W.C. Jr., 8:33429
Cohn, A., *See* Spengler, C.J., 8:33979
Cohn, S.H., Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R;US)
Cole, B.M., *See* Clark, L.L., 8:33188
Cole, R.L., Comparison of testing methods for latent-heat-storage devices, 8:33548 (R;US)
Cole, W.J., *See* Barron, J.J., 8:33490
See Niles, J.E., 8:33527
Coleman, C.E., Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J;US)
Coles, D., *See* Bazan, F., 8:33234
Colley, J.D., Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers, 8:33038 (RA;US)
Collier, I.E., DNA repair in a congeneic pair of mice with different longevities, 8:34605 (J;CH)
Collier, J.M., *See* Chen, G.T.Y., 8:34549
Collins, A., *See* McWhinney, R.T., 8:33865
Colter, C., *See* Livne, Z., 8:33729
Colyer, R.D., Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California, 8:33518 (J;US)
Comly, C. IV, Tank 16 demonstration: multipump test results, 8:33211 (R;US)
Compere, A.L., *See* Griffith, W.L., 8:33136
Compton, R.N., Photodetachment cross sections for $He^-(^4P^o)$, 8:34729 (J;US)
Concus, P., Existence criteria for fluid interfaces in the absence of gravity, 8:34738 (R;US)
Conklin, J.C., *See* Ball, S.J., 8:33760
Connell, G.M., Identification of androgen receptors in the male mouse lung, 8:34479 (RA;US)
Conner, C., *See* Place, W., 8:33894
Connick, R.E., Equilibrium constant for the dimerization of bisulfite ion to form $S_2O_5^{2-}$, 8:34104 (J;US)
Connolly, M., *See* Franta, G., 8:33506
Connolly, M.S., Activation of chemical reaction by impact of molecules on a surface, 8:34161 (J;US)
Connor, T.H., *See* Legator, M.S., 8:34640
Conrad, M.C., PGDP dike testing program, 8:33151 (RA;US)
Contopoulou, R., *See* Mortimer, R.K., 8:34502
Contreras, E.C.A., *See* de Oliveira, A., 8:33626
Cook, J., Natural convection heating system: off-the-wall evaluation methods, 8:33428 (J;US)
Cooke, C.M., Surface flashover of gas/solid interfaces, 8:33635 (RA;US)
Cooke, D.W., *See* Schillaci, M.E., 8:34865
Cooke, M.J., *See* Minchener, A.J., 8:33092
Coons, J.D., *See* Francis, D.V., 8:33032
Cooper, C.B., *See* Santhanam, C.J., 8:33061
Cooper, D.G., Biosurfactants and enhanced oil recovery, 8:33117 (RA;US)
Cooper, D.W., Critical review of the reactor-safety study radiological health effects model. Final report, 8:33766 (R;US)
Cooper, R.E., *See* Long, L.W., 8:34254
Cooper, W.A., *See* Carreras, B.A., 8:34902
Coope, M.S., *See* Moir, R.W., 8:34949
Coppa, A.P., Composite flywheels: status and performance assessment and projections, 8:33779 (R;US)
Coppin, P.A.W., Design and standardisation of meteorological measurements for wind energy converting systems, 8:33585 (R;DE;In German)
Corbett, B.L., Bulk Shielding Facility quarterly report October, November, and December 1982, 8:33734 (R;US)
Cordero, P., Ambiguities of functional integrals for fermionic systems, 8:34870 (R;XA)
Cordier, A., Visualization by holographic interferometry of temperatures in passive components, 8:33442 (J;US)
Cordova, A.H., Coming in close with Minac, 8:33731 (J;US)
Corlett, R.C., Prospects for laboratory simulation of UCG system phenomena, 8:32993 (RA;US)
Cornell, R.H., *See* Lesuer, D.R., 8:34214
Cornwell, D., *See* Milosevic, I., 8:34245
Corradini, M.L., *See* Swenson, D.V., 8:33771
Corum, C.R., *See* Repko, J.D., 8:34635
Corvi, F., *See* Brusegan, A., 8:34815
Costa, J.R., Analysis of the metallic containment integrity of Angra I, 8:33745 (RA;BR;In Portuguese)
Costantino, R.W., *See* Lindman, R., 8:33367
Costescu, J., *See* Pohl, P., 8:33664
See Schlosser, G., 8:33703
Cotter, S.J., *See* Miller, C.W., 8:34411
Coty, V.F., *See* Yarbrough, H.F., 8:33123
Coutant, C.C., Evidence for upstream dispersion of adult caddisflies (trichoptera: hydrosychidae) in the Columbia River, 8:34444 (J;NL)
Covell, J., *See* Davis, B.E., 8:32971
Cowell, W.R., *See* Shafton, A.L., 8:34955
Cox, D.C., *See* Baybutt, P., 8:33819
Cox, D.K., Thermal resistance of juvenile crayfish, Cambarus bartoni (fabricius): experiment and model, 8:34611 (J;US)
Cox, L.E., XPS evidence for 5f bonding participation in UO_3, 8:33991 (J;NL)
Craig, G.N. II, *See* Burns, L.K., 8:32994
Craise, L.M., *See* Tobias, C.A., 8:34594
See Yang, T.C., 8:34593
Cramer, J.G., *See* Back, N.L., 8:34834
Crasemann, B., Inner-shell x-ray and auger spectroscopy: manifestation of the Breit interaction in properties of few-hole and few-electron atomic systems, 8:34712 (RA;US)
Cravens, J.B., *See* Griffith, W.L., 8:33136
Crawford, B.D., *See* Hildebrand, C.E., 8:34617
Crawford, E.J., ^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo, 8:34508 (J;GB)
Crawford, P.B., Possible reservoir damage from microbial enhanced oil recovery, 8:33112 (RA;US)
Crawford, R.W., Organic analysis with a combined capillary gas chromatograph/mass spectrometer/

Fourier transform infrared spectrometer, 8:34149 (J;US)
Crawford, S.J., Architectural/solar design methodology, 8:33511 (J;US)
Crawford, T.V., Environmental protection analysis and planning for proposed Savannah River Plant actions, 8:34440 (R;US)
Cress, W.R., Materials of construction problems at Pleasants Power Station, 8:33029 (RA;US)
Creutz, C., Photochemical energy conversion and solution kinetics, 8:34177 (R;US)
Crews, J., *See* Marina, J., 8:33394
Crichton, B.H., Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA;US)
Crisciani, F., Quantum limitations for spin measurements on systems of arbitrary spin, 8:34872 (R;XA)
Croce, P.A., Feasibility study of a sealed safety monitor for trucks carrying LNG and other hazardous materials, 8:33165 (R;US)
Cromer, D.T., Structure of N_2 at 49 kbar and 299 K, 8:34141 (J;DK)
See Schiferl, D., 8:34051
Crumpton, W.G., Method for preparing permanent mounts of phytoplankton for critical microscopy and cell counting, 8:34563 (J;US)
Csallner, P., Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R;DE;In German)
Cullen, W.H., Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R;US)
Current, K.W., *See* Balch, J.W., 8:34251
Curro, J.G., *See* Sayre, J.A., 8:34017
Curtis, L.J., Semiempirical studies of the spectra heavy and highly ionized atoms, 8:34718 (RA;US)
Curtis, S.B., Ideas on the unification of radiobiological theories, 8:34595 (RA;US)
Curtiss, L.A., Study of vapor phase association in an acetic acid-water binary mixture by measurement of thermal conductivity and molecular orbital calculations, 8:34143 (BA;US)
Cushman, J.B., Design Allowables Test program, Celion 3000/PMR-15 and Celion 6000/PMR-15, graphite/polyimide composites. Final Report, 8:34011 (R;US)
Custer, J., *See* Divers, E., 8:33077
Cutshall, N.H., Low-level waste research and development program, 8:33225 (RA;US)
Cutting, S.A., *See* Camarata, S.J. Jr., 8:33481
Cybulskis, P., *See* Benjamin, A.S., 8:33774
Cyrus, W.L., Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels), 8:33968 (R;US)
Czirr, J.B., Measurement of the $^{10}B/^{6}Li$ cross section ratio below 1 keV, 8:34802 (J;US)
Czuchlewski, S.J., *See* Goldstein, J.C., 8:34856

D

D'Ippolito, D.A., Magnetic-coil optimization for quadrupole-stabilized mirror systems, 8:34938 (R;US)
da Costa, M.P.R., *See* Winters, M.H.W., 8:33778
da Rocha, L.M.G., Aspects of the Brazilian law on civil liability for nuclear damage, 8:33777 (B;BR;In Portuguese)
da Silva, A.J.C., Physical protection of nuclear-facilities and materials, 8:33257 (B;BR;In Portuguese)
da Silveira, P.R.N., Evolution and present situation of nuclear energy legislation in Brazil, 8:33820 (B;BR;In Portuguese)
Dabbs, J.R., The Pinhole/Occulter facility, 8:34689 (R;US)
Dafni, E., *See* Ben-Zvi, I., 8:34331
Dagan, U., *See* Livne, Z., 8:33729
Dahlgren, T., Temperature booster of waste heat for room heating, 8:33937 (R;SE;In Swedish)
Dajkovskij, A.G., *See* Abramov, A.G., 8:34311
Dale, S.J., Voltage-time characteristics of breakdown in SF_6, 8:33633 (RA;US)
Daley, J.G., *See* Heames, T.J., 8:34262
Dalke, K.G., Negative brain scintigrams in brain tumors, 8:34518 (R;DE;In German)
Dalton, T.C., *See* Schultz, J.A., 8:33371
Damin, D.G., *See* Bebout, R.A., 8:32964
Danesi, P.R., Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J;GB)
Danfors, B., *See* Noren, O., 8:33328
Daniel, P.L., Corrosion of carbon steel in substoichiometric combustion gases, 8:34257 (BA;US)
Danilenko, V.N., Calibration of semiconductor gamma spectrometer by means of limited number of energy standards, 8:34473 (RA;SU;In Russian)
Dargay, J., Demand of energy by households. Some studies of the determining factors of the demand and of the effects of the allotment by energy taxation, 8:33892 (R;SE;In Swedish)
Daryanani, S., *See* Marcheske, M., 8:33517
Das, P.K., *See* Chattopadhyay, S.K., 8:34179
Datz, S., Dielectronic recombination: recent results from ORNL, 8:34719 (RA;US)
Resonant coherent excitation of fast heavy ions, 8:34715 (RA;US)
Daughton, C.G., Colorimetric and titrimetric quantitation of ammonia in oil shale wastewater, 8:33172 (RA;US)
Microbial biomass in oil shale wastewaters: quantitation as protein, 8:33174 (RA;US)
Quantitation of oil shale wastewater quality. A manual of analytical methods, 8:33175 (R;US)
Rapid fractionation of oil shale wastewaters by reverse-phase separation, 8:33170 (RA;US)
See Jones, B.M., 8:33173
See Langlois, G.W., 8:33171
Davids, C.N., *See* Holland, R.E., 8:34800
Davies, A.J., Positive switching impulse breakdown of sphere-plane gaps in dry and moist air, 8:34029 (RA;US)
Davies, W.G., *See* Andrews, H.R., 8:34342
Davis, B.E., Status of the Rawlins UCG-SDB program, 8:32971 (RA;US)
See Bruggink, P.R., 8:32972
See Graham, R.H., 8:32988
Davis, B.H., *See* Sagues, A.A., 8:33004
Davis, H.I., *See* Noonan, J.R., 8:33990
Davis, M.A., Humidity fluctuations in solar greenhouse-residences, 8:33477 (J;US)
Davis, P.A., *See* Forte, T.M., 8:34552
Davis, W.C., Equation of state from detonation velocity measurements, 8:34391 (J;US)
Davy, K.V., *See* Windheim, L.S., 8:33922
Daw, C.S., *See* Krishnan, R.P., 8:34256
Dayton, G.O., *See* Biggers, J.V., 8:34671
de Araujo, J.L.R.H., *See* Gomes, F.M., 8:33846
de Faria, N.M., Legal bases for the installation of nuclear power plants, 8:33700 (B;BR;In Portuguese)
de Goes Fischer, M.D., *See* da Silveira, P.R.N., 8:33820
de Gruijl, F.R., Dose-time relationship for UV-tumorigenesis, 8:34663 (RA;DE)
De Jarlais, G., Hydrodynamics of adiabatic inverted annular flow: an experimental study, 8:33738 (R;US)
de Jesus Zerbini, E.C.G., Nuclear energy - the Brazilian rules for the environment protection, 8:34421 (B;BR;In Portuguese)
de Jesus Zerbini, E.C.G. de, Nuclear energy and the rules of environment protection, 8:33845 (RA;BR;In Portuguese)
de Jonghe, L.C., *See* Porter, J.R., 8:33992
de Lima, J.M., Qualification of reactor operators, 8:33704 (RA;BR;In Portuguese)
de Lima Moreira, Y.M., *See* de Faria, N.M., 8:33700
De Notaristefani, F., *See* Dell, G.F., 8:34754
de Oliveira, A., Cost evolution of electric energy in Brazil, 8:33626 (RA;BR;In Portuguese)
de Oliveira, L.F.S., *See* Hamacher, M.E., 8:33215
de Oliveira, S.C.C., *See* da Silveira, P.R.N., 8:33820
Dearstone, K., *See* Selkirk, J.K., 8:34642
DeBruin, E.P., *See* Hankes, L.V., 8:34511
Deffenbaugh, F.D., Utilization of the oceans for sub-scale testing of OTEC components, 8:33391 (RA;US)
DeFreece, D., *See* Abdou, M., 8:34921
DeGuzman, R.J., *See* Alpen, E.L., 8:34597
See Rodriguez, A., 8:34596
Delgass, W.N., CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R;US)
Delia, A.M., Financing of OTEC projects, 8:33289 (RA;US)
Delis, K., *See* Haas, H., 8:34218
Dell, G.F., Multigamma-ray events at the CERN ISR, 8:34754 (J;NL)
DeLucia, J., *See* Izzo, R., 8:34907
DeMark, B.R., Amonia gas: an improved reagent for chemical ionization mass

spectrometry of bile acid methyl ester acetates, 8:34078 (J;US)
Demmel, D., *See* Chen, B., 8:33424
Demoulin, M., *See* Carroll, J.T., 8:34321
Dempsey, J.H., *See* Chang, J.C.S., 8:33051
Denardo, G., Quantum effective potential in S^1xR^3, 8:34773 (R;XA)
Denbraven, K.R., *See* Duff, W.S., 8:33408
DenHartog, P., Comparative performance of stripper foils in the Argonne FN tandem, 8:34339 (BA;US)
Denning, R.S., *See* Baybutt, P., 8:33819
Derby, J.J., *See* Scott, J.E., 8:33067
Derenzo, S.E., New instrumentation for high-resolution, dynamic, three-dimensional tomography of positron-labeled compounds in the human body, 8:34378 (RA;US)
See Budinger, T.F., 8:34557
See Huesman, R.H., 8:34546
Deruytter, A.J., *See* Wagemans, C., 8:34842
Desai, U., *See* Wiehl, H.J., 8:34688
Desmond, R.M., *See* Lints, M.C., 8:33910
Desrosiers, A.E., *See* Poeton, R.W., 8:33761, 8:33762, 8:33763
Deter, D.R., *See* Bartholly, H., 8:33382
Deutsch, R., Theory of neutron spectra from d-d-reactions in the linear z-pinch and the plasma focus, 8:34897 (R;DE)
Deutscher, S.B., *See* Richardson, J.H., 8:34192, 8:34193
DeVan, J.H., *See* Ficalora, P.J., 8:33090
DeVre, M.W., *See* Atkins, J.M., 8:34040
Dewes, P., Irradiation behaviour of UO_2/PuO_2 mixed oxide fuel in the experiments IFA 427 and IFA 428 in the Halden boiling water reactor, 8:33687 (R;DE;In German)
DeWitt, S.C., Integrating passive solar systems with exciting architectural form, 8:33513 (J;US)
Low cost passive solar townhomes, 8:33492 (J;US)
Diamond, H., Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass, 8:33238 (J;US)
Diamond, W.P., Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/ 1982, 8:33078 (R;US)
DiBlasio, E., *See* Jack, T.R., 8:33114
Dietrich, R., Finite element analysis for evaluation of eigenfrequency and natural shape alterations by welded joint cracks for pipes of offshore-platforms, 8:34260 (R;DE;In German)
Dietz, D.N., Underground storage of radioactive waste in rock salt: organization of the work concerning the underground storage of radioactive waste, 8:33230 (R;NL)
Dignet, D., Study of solar module technology with good thermal dissipation. Final report, 8:33323 (R;XE;FR)
Dimov, G.I., Axisymmetric ambipolar trap, 8:34908 (TG;US)
Divers, E., Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982, 8:33077 (R;US)
Dmitrievskij, V.P., *See* Dzhelepov, V.P., 8:34269
do Amarante, J.A.A., Energy-development correlation and the nuclear strategy in Brazil. Part 1, 8:33796 (RA;BR;In Portuguese)
Energy-development correlation and the nuclear strategy in Brazil. Part 2, 8:33814 (RA;BR;In Portuguese)
Doctor, R.D., Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R;US)
Dodds, H.L. Jr., *See* Pevey, R.E., 8:34852
Dodds, S.A., *See* Schillaci, M.E., 8:34865
Dodge, L.G., Mechanisms of smoke reduction in the high-pressure combustion of emulsified fuels. Volume II. Experimental and theoretical study of evaporating emulsified and neat fuel sprays. Annual progress report No. 2, 29 September 1980-29 September 1981, 8:34210 (R;US)
Doebner, H.D., *See* Denardo, G., 8:34773
Doehler, G., Effect of UV-B radiation on the marine diatom Bellerochea yucatanensis, 8:34662 (RA;DE)
Doerschel, B., *See* Spurny, F., 8:34372
Dohnal, D., X-ray emission of high voltage vacuum devices, 8:34517 (R;DE;In German)
Dohnt, G., *See* Renger, G., 8:34582
Dolberg, D.S., Anomolous inability of Rous sarcoma virus to cause tumors in avian embryos, 8:34560 (RA;US)
Doll, J.D., *See* Adams, J.E., 8:34128
Donaldson, E.C., International conference on microbial enhancement of oil recovery, 8:33104 (R;US)
Donath, G., Reduction of noise emitted by medium-speed diesel engines by partial encasing, 8:33946 (R;DE;In German)
Donnelly, J.R., Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA;US)
Dooher, J., *See* Dell, G.F., 8:34754
Dore, U., *See* Dell, G.F., 8:34754
Dorfman, L.M., Fast reaction studies of organic ions in solution, 8:34203 (BA;NL)
Principles and techniques of radiation chemistry, 8:34200 (J;US)
Dorning, J.J., *See* Hertel, N.E., 8:34859
Dosik, R.S., Renewable energy resources in the developing countries, 8:33873 (RA;US)
Doughty, D.A., Effect of impurities on partial molal volume and critical micelle concentration of sodium dodecyl sulfate. Correction of micelle aggregation number, 8:34159 (J;US)
Douglass, D.A., Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R;US)
Doute, Y., *See* Bogenrieder, A., 8:34657
Dowell, F., Comments on column characterization: a sulfur column, 8:34069 (J;DE)
Downs, R.A., *See* Garbini, J.L., 8:33907
Dragt, J.B., *See* Janssen, A.J., 8:33597
Drehmel, D.C., SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA;US)
Dreisbach, K., *See* Biasin, K., 8:33409
Drepper, F., *See* Hoepfinger, E., 8:33792
Driemeyer, D.E., Neutron activation in EBT-P, 8:34912 (R;US)
Drumheller, D.S., Thermomechanical theory for reacting immiscible mixtures, 8:34145 (J;DE)
Dub, W., Wind turbine parks in electric utility systems, 8:33594 (RA;DE)
Dubi, A., Confidence limits and statistical convergence of Monte Carlo point flux estimators with unbounded variance, 8:33711 (RA;IL)
Duchane, D.V., Submicron, unbacked, shaped metal foils, 8:33962 (R;US)
Dudziak, D.J., *See* Clark, B.A., 8:34854
Duff, W.S., Development of a day by day simulation of solar systems, 8:33408 (R;US)
Duffie, J.A., *See* Beckman, W.A., 8:33452
Duffield, J., Integrated passive solar and wood design for the Pacific Northwest, 8:33514 (J;US)
Joint optimization of solar and superinsulation in a cold climate, 8:33443 (J;US)
Duffy, J., *See* Fanning, M.W., 8:33466
Dufour, C., *See* Peterson, J.R., 8:33958
Dumpert, K., Response of different crop and vegetable cultivars to UV-B-irradiance: preliminary results, 8:34650 (RA;DE)
Dunbar, L.E., Market potential for OTEC in developing nations, 8:33294 (RA;US)
Dung, M.H., Pattern formation in the Schloegl model of nonlinear kinetics, 8:34202 (J;NL)
Dunlap, B.D., *See* Shenoy, G.K., 8:34832
Dunlap, J.L., *See* Carreras, B.A., 8:34902
Dunn, H.W., Quantitative determination of chrysotile in building materials, 8:34072 (J;GB)
Dunne, L.A., *See* Albanese, J.R., 8:34668
Durbin, P.W., New sequestering agents for the actinides, 8:34206 (RA;US)
Durou, C, *See* Cordier, A., 8:33442
Dutta, S.K., Gene level control, 8:34565 (BA;US)
Nuclear controls: discussant's introduction, 8:34564 (BA;US)
Dutton, J., *See* Davies, A.J., 8:34029
Duvall, K.C., *See* Meier, M.M., 8:34843
Duvernoy, E.G., *See* Rankin, W.L., 8:33730
Dyer, M.I., Environmental resources, 8:34422 (RA;US)
Dyumin, A.N., *See* Andrienko, V.B., 8:34538
Dzhelepov, V.P., Present status of construction of the JINR high current phasotron ("F" facility), 8:34269 (RA;SU;In Russian)

E

Eakes, R.G., *See* Lamoreaux, G.H., 8:34222
Easterling, R.G., *See* Sinnock, S., 8:34669
Eastman, D.E., *See* Chiang, T.C., 8:34114
Eaton, R., *See* Schultz, J.A., 8:33371
Ebbe, S., Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA;US)
Eckenrode, R.J., *See* Rankin, W.L., 8:33730
Eckert, T., *See* Schumacher, D.G., 8:33756

Edington, J.W., *See* Brown, R., 8:33983
Edler, S.K., Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R;US)
Edner, S., *See* Ahling, B., 8:33278
Edwards, J.J., *See* Boernke, W.E., 8:34147
See Tollaksen, S.L., 8:34175
Egely, G., Study of momentum transfer in two-fluid formulation of two-phase flow, 8:34230 (R;US)
Eggwertz, S., Safety of wind energy conversion systems with horizontal axis (HA WECS), 8:33607 (R;SE)
Ehrenson, S., Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J;US)
Ehret, C.F., Chronon theory of circadian rhythm control, 8:34570 (BA;US)
Ehst, D., *See* Abdou, M., 8:34921
Eichinger, B.E., *See* Brotzman, R.W., 8:34156
Eid, Y., *See* Adib, M., 8:34803
Eisen, Y., Comparison of polycarbonate and CR-39 foils as passive detectors in the wide energy range personnel neutron dosimeter, 8:34357 (RA;IL)
Development of a combined real-time neutron dosimeter in the 1 eV to 14 MeV energy region and a survey meter for high neutron dose rates, 8:34358 (RA;IL)
Performance of the wide energy Rem response personnel neutron dosimeter, 8:34361 (RA;IL)
See Faermann, S., 8:34359, 8:34360, 8:34362
Eisenhardt, G., Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R;DE;In German)
Eisenstadt, E., *See* Legator, M.S., 8:34640
Ekengren, O., Technique for the purification of metal containing mining waters. Literature survey, 8:33056 (R;SE;In Swedish)
Ekman, E., Evaluation of the decantation centrifuge process, 8:33080 (R;SE;In Swedish)
El-Sabagh, M.A., *See* Morsy, M.W., 8:34868
Elbaum, B.L., Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R;US)
Elder, G.B., Electron heating and superthermal electron enhancement due to electron cyclotron heating in ISX-B at 28 GHz, 8:34900 (R;US)
Elder, H.W., Kilowatts from coal, 8:33023 (RA;US)
Eley, C., Passive Solar Masonry Workbook, 8:33488 (J;US)
Elfgren, L., *See* Stephansson, O., 8:33896
Elias, E., *See* Kaizerman, S., 8:33674
Eliezer, D., *See* Minkovitz, E., 8:33961
Elioff, T., *See* Gough, R., 8:34317
Elleman, D.D., *See* Lee, M.C., 8:34911
Elliott, C.W., *See* Strong, S.J., 8:33363
Ellis, K.J., *See* Cohn, S.H., 8:34512
Ellis, R.P., *See* Donnelly, J.R., 8:33052
Ellis, S.D., Quark fragmentation and the determination of α_s, 8:34756 (R;US)
Ellison, W., *See* Jenkins, S.D., 8:33043
Elperin, T., *See* Dubi, A., 8:33711
Elwyn, A.J., *See* Holland, R.E., 8:34800
Emerson, C.J., *See* Fields, D.E., 8:33195
Emery, A.F., Parametric study of a passive solar-heated house with special attention on evaluating occupant thermal comfort, 8:33479 (J;US)
Use of cost-effectiveness and comfort bases for selecting from among alternative envelope design strategies for a high-rise office building, 8:33909 (J;US)
See Garbini, J.L., 8:33907
Endlich, R.M., Improved diagnostic model for estimating wind energy, 8:33589 (R;US)
Enell, M., *See* Granelli, W., 8:33337
Engelke, R., Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J;NL)
Engelstaedter, R., *See* Haas, H., 8:34218
Enger, M.D., *See* Hildebrand, C.E., 8:34617
See Tobey, R.A., 8:34641
England, A.C., *See* Elder, G.B., 8:34900
Engler, G., *See* Eisen, Y., 8:34358
Epstein, J., *See* Nadel, J.A., 8:34631
Epstein, J.B., *See* Harris, A.G., 8:33102
Erbs, D.G., Degree-days for variable base temperatures, 8:33470 (J;US)
Erickson, D.J., *See* Caird, R.S., 8:34928
Erickson, E.L., OTEC: a business strategy perspective, 8:33285 (RA;US)
Erickson, P.R., *See* Griffith, W.L., 8:33136
Eriksson, A., *See* Svensson, J.E., 8:33806
Eriksson, S., Energy forestry in the north of Sweden, 8:33336 (R;SE;In Swedish)
Ermler, W.C., Ab initio effective core potentials including relativisitc effects: a procedure for the inclusion of spin-orbit coupling in molecular wavefunctions, 8:34119 (J;NL)
Esipov, A.A., Facility for studying radiation damage of structural materials by the differential perturbed angular correlation method, 8:34474 (RA;SU;In Russian)
Eskander, S.S., Effect of PURPA on OTEC economics, 8:33302 (RA;US)
Espenson, J.H., *See* Gjerde, H.B., 8:34115
Esposito, M.S., Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae, 8:34504 (RA;US)
Etelba, M., Statistical voltage-time curves of an SF_6-insulated coaxial-cylinder gap, 8:34032 (RA;US)
Ethridge, F.G., *See* Burns, L.K., 8:32994
Evans, D., *See* Levy, E., 8:33486
Evans, J.S., *See* Cooper, D.W., 8:33766
Evans, M.A., Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R;US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R;US)
Evseev, A.K., *See* Akulov, V.V., 8:34265
Ewald, R.H., High-performance computing at Los Alamos, 8:34960 (R;US)
See Buzbee, B.L., 8:34970
Eyal, Y., JULIAN II. A code for multiple-chance fission and multi-step particle and gamma ray emission in compound nuclear reactions, 8:33718 (RA;IL)
Leaching behavior of monazite, 8:33217 (RA;IL)
Long-term stability of alpha-recoil damage in monazite, 8:33218 (RA;IL)
See Hoffman, S., 8:33219

F

Fabbri, F., *See* Leugers, B., 8:34821
Fabrikant, J.I., Effects of the accident at Three Mile Island on the mental health and behavioral responses of the general population and nuclear workers, 8:33750 (R;US)
Heavy-ion radiography, 8:34550 (RA;US)
Radiation epidemiology, 8:34591 (RA;US)
Stereotactic heavy-ion irradiation of intracranial vascular disorders, 8:34547 (RA;US)
Fabry, R., *See* Ledent, P., 8:32975
Fackler, M., *See* Donath, G., 8:33946
Faehnrich, V., Automatic analyzers for monitoring water composition and their applications in nuclear power engineering, 8:33679 (RA;CS;In Czech)
Faermann, S., Directional dependence of the wide energy range Rem response personnel neutron dosimeter, 8:34359 (RA;IL)
Passive spectrometer for fast neutrons in the energy range 0.5-14 MeV, 8:34362 (RA;IL)
Saturation effects in polycarbonates irradiated at high doses, 8:34360 (RA;IL)
See Eisen, Y., 8:34357, 8:34361
Faibis, A., Use of molecular ion beams from a tandem accelerator, 8:34344 (BA;US)
Failor, R., *See* Bazan, F., 8:33234
Falicov, L.M., *See* Osorio, R., 8:34105
Fallon, P.T., *See* Steinberg, M., 8:32946
Falomkin, I.V., *See* Mikhajlov, M.N., 8:34377
Faltens, A., Long-pulse induction acceleration of heavy ions, 8:34270 (R;US)
See Chupp, W., 8:34284
Fame, T.M., *See* Feldman, I., 8:34489
Fanchi, J.R., Black-oil reservoir simulator is now available, 8:33135 (J;US)
Fanchiotti, A., Trombe wall test and simulation, 8:33438 (J;US)
Fang, W.C., Hot corrosion/fouling of metals beneath surface deposits, 8:33985 (BA;US)
Fanneloep, T.K., Hydrodynamics of underwater blowouts, 8:33154 (R;NO)
Fannick, N., *See* Baker, D., 8:34630
Fanning, M.W., Comparison of measured and predicted thermal performance of passive solar residences, 8:33466 (J;US)
See Gruber, J.O., 8:33459
Farish, O., *See* Korasli, C., 8:34021
Farlow, N.H., *See* Oberbeck, V.R., 8:34395
Farmer, J.C., Effect of organic adsorbates on the initial stage of electrolytic

metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R;US)
Farrell, K., Response of aluminum and its alloys to exposure in the high flux isotope reactor, 8:33735 (R;US)
Farrington, F., *See* Nicklin, T., 8:33141
Farrow, M.G., *See* Legator, M.S., 8:34640
Farrow, R.A., *See* Hatch, J.R., 8:33016
Fassett, D.W., *See* Kunselman, L.V., 8:32981
Favard, G.J., Preliminary optical performance study of glazing-reflector systems in breadbox water heaters, 8:33439 (J;US)
See Duff, W.S., 8:33408
Faxen, T., Investigating the Gill UVW-anemometer as a rugged turbulence instrument for wind power applications, 8:33615 (R;SE)
Faxwall, S., *See* Stephansson, O., 8:33896
Fazio, M.V., *See* Owen, R.K., 8:34282
Fedotov, M.T., *See* Akulov, V.V., 8:34265
Fee, D.C., *See* Krumpelt, M., 8:33882
Fegeneee, J.A., Ashland, Orgen's solar strategy, 8:33311 (J;US)
Feldman, I., Comparison of the effects of glucose, glucose 6-phosphate and inorganic orthophosphate on the fluorescence and quenchability of hexokinase, 8:34489 (J;NL)
Feldmeier, H., Gross properties of nuclei and nuclear excitations. Proceedings, 8:34761 (R;DE)
Felix, W.D., *See* Smith, R.D., 8:34064
Feng, I., *See* Lee, M.C., 8:34911
Fenimore, J.W., *See* Stone, J.A., 8:33203
Ferrandi, G., Photochemical properties of copper complexes, 8:34187 (J;NL)
Ferreira, E.M., Proceedings of the sixth symposium on theoretical physics. Solide state, biophysics and chemical physics, 8:34722 (R;BR)
Proceedings of the sixth symposium on theoretical physics. Elementary particle physics and relativity, 8:34781 (R;BR)
Proceedings of the sixth symposium on theoretical physics. Nuclear physics, plasma physics and statistical mechanics, 8:34878 (R;BR)
Ferreira, E.P., Development of the Tandar project, 8:34329 (BA;US)
Fessenden, R.W., Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA;GB)
Ficalora, P.J., Thermochemistry of fluidized-bed atmospheres, 8:33090 (BA;US)
Fichtel, C., Study of the diffuse galactic gamma radiation, 8:34685 (R;US)
Ficsor, G., *See* Legator, M.S., 8:34640
Fidleris, V., *See* Cheadle, B.A., 8:33987
Fiechter, A., *See* Guerra-Santos, L., 8:33105
Fields, D.E., Computerized methodology for evaluating the long-range radiological impact of shallow-land burial, 8:33195 (RA;US)
See Miller, C.W., 8:34411
Findlay, J.A., *See* Schumacher, D.G., 8:33756
Findley, J.E., *See* Jang, L.K., 8:33110
Finlay, R.W., *See* Yamanouti, Y., 8:34813
Finn, P.A., Effects of tritium contamination in the FED/INTOR reactor hall, 8:34916 (R;US)
Wall tritium contamination as a factor in fusion-reactor wall design, 8:34918 (R;US)
Finnerty, W.R., *See* Singer, M.E., 8:33115
Fiore, N.F., Abrasion in multiphase alloys, 8:34003 (BA;US)
Firth, M., *See* Faltens, A., 8:34270
Fischer, C.F., Lifetimes of low-lying $^2P^0$, ^2D, and $^2F^2$ states of the Al I isoelectronic sequence, 8:34730 (J;SE)
Fischer, S.M., *See* Slaga, T.J., 8:34616
Fisher, H., Rough-crack model for pore compressibility: application to data for crack compliance around a borehole, 8:33572 (RA;US)
Fisher, W.J., Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J;US)
Fite, J., Improvement of reactor physics design methods for plutonium recycling in pressurized water reactors, 8:33702 (R;DE;In German)
Fjeldsted, J.C., *See* Smith, R.D., 8:34064
Flanders, K.L. Jr., Security and risk analysis at Savannah River, 8:34957 (R;US)
Fleischmann, R., Crude gas/air fuel cells with fixed phosphoric acid, 8:33881 (R;DE;In German)
Flemings, M.C., *See* Matsumiya, T., 8:33993
Flerov, G.N., Application of accelerators for solution of the national economy problems, 8:34266 (RA;SU;In Russian)
Fletcher, A.G., *See* Wiltsee, G.A., 8:32941
Fliermans, C.B., Measure of Legionella penumophila activity in situ, 8:34561 (J;US)
Flood, W.S., *See* Goldberg, D.A., 8:34285
Flores, L.F.V., Freon Rig design for performing heat transfer experiments for nuclear reactors fuel bundles, 8:33670 (RA;BR;In Portuguese)
Foelsner, W., Simple mechanism for the release of laser targets, 8:34932 (R;DE)
Foerstel, H., $^{18}O/^{16}O$ ratio in groundwater of the Federal Republic of Germany, 8:34667 (R;DE;In German)
Fontana, E.C., *See* Olszewski, M., 8:33900
Fontoynont, M., *See* Place, W., 8:33894
Foosnaes, T., *See* Pellin, M.J., 8:33988
Forn, G., *See* Maurel, J., 8:34701
Forrestal, M.J., Analytical and experimental studies on penetration into geological targets, 8:34225 (R;US)
Forsberg, H.C., Technology demonstration report for the Mirror Fusion Test Facility (MFTF-B), 8:34946 (R;US)
Forsberg, E., Cleaning of steam coal prior to combustion, 8:32958 (R;SE;In Swedish)
See Carlson, R., 8:33085
Forsythe, R., *See* Huang, J.C., 8:34162, 8:34163
Forte, T., *See* Thrift, R., 8:34481
Forte, T.M., Apolipoprotein E in umbilical cord blood plasma, 8:34552 (RA;US)
Fortune, O.F., *See* Samuel, E.A., 8:33045
Foss, M.H., *See* Turner, L.R., 8:34920
Foster, J.L., Case studies of electric-generating-plant demographics: efficiency and availability enhancements, 8:33618 (R;US)
Foster, M., *See* Moses, V., 8:33124
See Springham, P.G., 8:33125
Foust, H.D., Constructability of extended surface heat exchangers for OTEC, 8:33380 (RA;US)
Fowler, C.M., *See* Caird, R.S., 8:34928
Fowler, J.L., Nuclear cross sections for technology, 8:34794 (B;US)
Fowler, J.S., *See* Crawford, E.J., 8:34508
Fowlkes, C.W., Controlling the accuracy of solar radiation data from a low cost, 30 station network, 8:33468 (J;US)
Interfacing a $10 calculator for data acquisition, 8:33436 (J;US)
Fox, M.A., Carbanion photooxidation at semiconductor surfaces, 8:34167 (J;US)
Fraley, D.M., *See* Hicks, N.D., 8:33039
Fraley, D.W., *See* Baybutt, P., 8:33819
Francis, D.V., Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility, 8:33032 (RA;US)
Francis, E.J., Building ocean thermal energy conversion facilities and plantships: requirements for unique construction facilities, 8:33387 (RA;US)
Francis, G.L., *See* D'Ippolito, D.A., 8:34938
Francko, D.A., Dynamics of cellular and extracellular cAmp in Anabaena flos-aquae (cyanophyta): intrinsic culture variability and correlation with metabolic variables, 8:34562 (J;US)
Isolation of cyclic adenosine 3′:5′-monophosphate (cAMP) from lakes of differing trophic status: Correlation with planktonic metabolic variables, 8:34445 (J;US)
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34457 (J;US)
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34507 (J;US)
UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake, 8:34443 (J;US)
Frankel, K.A., Correlated neutron-proton emission in relativistic heavy-ion interactions, 8:34751 (RA;US)
Franklin, C., *See* Hodson, E.K., 8:34973
Franks, L.A., *See* Capelle, G.A., 8:34386
Fransson, L., *See* Rahm, L., 8:33081
Franta, G., Utility impact and thermal performance of the Franta residence, 8:33506 (J;US)
Franzke, D.E., Determination of a knock criterion of the Otto-engine combustion and precalculation of the knock limit, 8:33950 (R;DE;In German)
Frederick, G., Underclad cracking in PWR reactor vessels, 8:33681 (TG;GB)
Frederick, L., *See* Dutta, S.K., 8:34565
Freel, J., *See* Anderson, R.P., 8:32945
Freeman, B.L., *See* Caird, R.S., 8:34928
Freeman, S.P., *See* Colyer, R.D., 8:33518
Frekers, D., *See* Kutschera, W., 8:34819
Frese, E., Development up to the construction stage of a quasiliquid

surface storage, in particular for a liquid gas, ball thrust container, 8:34216 (R;DE;In German)
Fric, Z., Development of electromagnetic filter for removing suspended material from water circuit, 8:33725 (RA;CS;In Czech)
Frick, B.R., Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R;DE;In German)
Frick, G., Carbon foil behavior with I beams, 8:34340 (BA;US)
Fricke, A.M., *See* Richards, A.D., 8:33058
Fried, S., *See* Nash, K.L., 8:34042
Friedkin, M., *See* Crawford, E.J., 8:34508
Friedland, R.P., Positron imaging studies in Alzheimer-type dementia, 8:34543 (RA;US)
Friedman, A.M., *See* Diamond, H., 8:33238
See Nash, K.L., 8:34042
Friedman, J.H., Projection pursuit regression, 8:34972 (J;US)
Fritz, G.T., *See* Aiken, R. L., 8:34070
Froelich, D.A., Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA;US)
Frostell, B., Biogas in China 1981 - a travel report, 8:33327 (R;SE;In Swedish)
Frurip, D.J., *See* Curtiss, L.A., 8:34143
Fry, H.A., *See* Jones, L.H., 8:34099
Fry, R.J.M., *See* Alpen, E.L., 8:34597
Frydenlund, A., *See* Wormley, D.N., 8:33396
Frydryszak, A., N=2 massive matter multiplet from quantization of extended classical mechanics, 8:34777 (R;XA)
Fu, C.Y., Pairing correction for particle-hole state densities, 8:34846 (R;US)
Fucci, A., *See* Carroll, J.T., 8:34321
Fueloep, M., Monte Carlo calculation of energy dependence for efficiency of moderating neutron detectors, 8:34365 (RA;CS;In Slovak)
Fuhrmann, F., *See* Kurth, M., 8:32984
Fujikawa, Kazuo, Comment on the Adler-Bardeen theorem in non-Abelian gauge theories, 8:34782 (R;JP)
Path integral of relativistic strings, 8:34783 (R;JP)
Fujimoto, N., *See* Boggs, S.A., 8:33641
Fujimoto, Y., N-anti N oscillation in SO(10) and SU(6) supersymmetric grand unified models, 8:34776 (R;XA)
Fujinami, H., Effect of restriking spark on dielectric strength to ground in a model gas insulated disconnecting switch, 8:33646 (RA;US)
Fujita, E., Bridged ferrocenes. VII. Correlation of redox potentials with structure, 8:34130 (J;NL)
Fukuda, T., Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric, 8:34784 (R;JP)
Quantum theory of massive Yang-Mills fields, 2. Gauge covariance, 8:34785 (R;JP)
Fuller, R., *See* Burwell, D., 8:33388
Fumagalli, A., Synthesis and x-ray crystal structure of $[PPN]^{+}_{2}[RuIr_4(CO)_8(\mu_8\text{-}CO)_8]^{2-}$, 8:34135 (J;NL)
Funderlic, R.E., LU decomposition of M-matrices by elimination without pivoting, 8:34977 (J;US)
Furlan, P., New approach to unified field theories, 8:34769 (R;XA)

G

Gaarding, M., Emission of mercury from an ash disposal, 8:33063 (R;SE;In Swedish)
Gabor, G., *See* Schimmerling, W., 8:34313
Gadelle, C., Major problems, first results and projects of underground gasification of deep coal in France, 8:32970 (RA;US)
Gaertner, M., *See* Dewes, P., 8:33687
Gaffey, C.T., *See* Tenforde, T.S., 8:34664
Gaffney, J.S., *See* Lin, H.B., 8:34077
Gaiser, J.E., Charmonium spectroscopy from radiative decays of the J/psi and psi', 8:34753 (R;US)
Galambos, J., SSBAPAC user manual, 8:34925 (R;US)
Galbenis, N., Briquetting behaviour of the raw fine coal sulphite waste lye mixtures and stability of the agglomerates with pressure gasification, 8:33083 (R;DE;In German)
Galbraith, H.W., Onset of the molecular quasicontinuum in SF_6, 8:34117 (J;NL)
Vibrational excitation in polyatomic molecules, 8:34189 (BA;US)
See Walker, R.B., 8:34168
Galin, J.C., *See* Kilp, T., 8:34180
Gallagher, B.M., *See* Crawford, E.J., 8:34508
Galli, A.F., *See* Wen, C.Y., 8:33271
Gallucci, F., *See* Carrara, G., 8:33629
Gantz, D., *See* Shipman, H. Jr., 8:33393
Garbini, J.L., Design of a moderate-cost microcomputer data acquisition system for experimental investigations of thermal systems, 8:33907 (J;US)
Garbow, B.S., *See* More, J.J., 8:34974
Garbutt, P., *See* Ebbe, S., 8:34589
Garcia, J., *See* Ward, D.C., 8:33130
Garcia, J.F., *See* Clemons, G.K., 8:34618
See Pennathur-Das, R., 8:34477
See Webber, R.J., 8:34480
Garcia, L.S. Jr, *See* Repko, J.D., 8:34635
Gardstein, C., *See* Levy, E., 8:33486
Gardy, D., *See* Byler, E., 8:33395
Garon, A.M., Rawlins UCG test 2 reactor growth, 8:32965 (RA;US)
Garrard, L.A., *See* Biggs, R.H., 8:34647
Garrett, A.J., *See* Carlson, D.C., 8:34414
See Smith, F.G., 8:34397
Garrigan, P.C., *See* Anderson, G.L., 8:32952
Garrison, F., *See* Hollinden, G., 8:33030
Garrison, M., Thermal mass in a hot-humid climate, 8:33532 (J;US)
Garvey, D.B., In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 3. Federal Regions V and VII, 8:33800 (R;US)
Gau, R., *See* Marcheske, M., 8:33517
Gauglitz, H.J., Studies on the method of voltammetric measurements in the liquid phases of NaCl/$AlCl_3$/SO_2, 8:34173 (R;DE;In German)
Gay, D.D., *See* Carlson, D.C., 8:34414
Gay, F.T. III., Regulatory authorities of the US Army Corps of Engineers over OTEC projects, 8:33300 (RA;US)
Gayet, P., *See* Berger, G., 8:34028
Gehri, D.C., *See* Lewis, M.F., 8:33049
Gehrs, C.W., Advanced fossil energy program, 8:34452 (RA;US)
Geipel, W., Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures $>=90°C$, 8:33780 (R;DE;In German)
Geisheker, P.J., Development of facilities and methods for thermal performance tests of passive domestic hot water systems, 8:33441 (J;US)
Geissel, H., Slowing down of fast heavy ions in matter, 8:34716 (RA;US)
Gelles, S.H., Phase separation in transparent liquid-liquid miscibility gap systems, 8:34740 (R;US)
George, S.M., Picosecond studies of vibrational linewidth broadening in liquids, 8:34091 (R;US)
Gerasimov, E.I., *See* Akulov, V.V., 8:34265
Gerber, M., Towards a bioclimatic architecture, 8:33507 (J;US)
Gerholm, T.R., Long range energy demand, 8:33794 (R;SE;In Swedish)
Gerich, C.A., *See* Harrison, M.A., 8:34944
Gershunov, E.M., Analysis of the up-ending problem of OTEC-1 cold water pipe, 8:33400 (RA;US)
Gesell, P., Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R;US)
Getz, P.A., Hazardous waste management alternatives utilized at the PGDP, 8:33192 (RA;US)
Ghirardi, G.C., Limitations of quantum measurements I: Determination of the minimal amount of non-ideality and identification of the optimal measuring apparatuses, 8:34869 (R;XA)
Limitations on quantum measurements II: Analysis of a model example, 8:34871 (R;XA)
See Crisciani, F., 8:34872
Ghosal, S.R., Catalytic steam reforming of hydrocarbon for production of synthesis gas, 8:33269 (J;IN)
Ghosh, S.C., *See* Ghosal, S.R., 8:33269
Gibson, E.D., *See* Kaplan, N., 8:33031
Gilni, D., Approximate method for the calculation of transmission probabilities through hollow cylinders, 8:33712 (RA;IL)
Gilbert, B.J., *See* Lotker, M., 8:33287
Gilbert, W., 9.1-T iron-free Nb-Ti dipole magnet with pancake windings, 8:34319 (R;US)
Ginocchio, J.N., Relationship between the Bohr collective model and the interacting boson model, 8:34848 (BA;US)
Giordano, S., Monochromatic radio frequency accelerator cavity, 8:34263 (R;US)
Gjerde, H.B., Concurrent and competitive homolysis and elimination reactions of (α-phenylethyl)aquocobaloxime, 8:34115 (J;US)
Glad, A.S., Structured multi-stream command language, 8:34926 (R;US)

Glasgow, G.P., *See* McDaniels, F.D., 8:34812
Glass, G.B., *See* Clark, M., 8:33168
Glass, R.E., Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (K;US)
Thermomechanical cavity growth modeling, 8:32977 (RA;US)
Glines, L.A., *See* Kahlon, T.S., 8:34482
See Lindgren, F.T., 8:34057
Goble, J.H., Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics, 8:34124 (J;NL)
Godbey, L.C., *See* Davis, M.A., 8:33477
Godinho, T.M., Legal aspects of search and mining of nuclear ores under Brazilian law, 8:33850 (B;BR;In Portuguese)
Goetz, T.E., Bubble entrainment on OTEC-1: implications for future OTEC designs, 8:33401 (RA;US)
Goetzlich, J., *See* Ryssel, H., 8:34242
Goforth, J.H., *See* Caird, R.S., 8:34928
Gohar, Y., EBT-P gamma-ray-shielding analysis, 8:34922 (R;US)
Goj, A.A., *See* Vagradov, G.M., 8:34764
Golbeck, J.H., Critical reassessment of the photosystem II content in bundle sheath chloroplasts of young leaves of Zea mays, 8:34492 (BA;US)
Gold, L.S., Carcinogenic potency, 8:34620 (RA;US)
Goldberg, D.A., Electron-beam buncher to operate over the frequency range 1-4 GHz, 8:34285 (R;US)
Golden, D.M., Summary of EPRI FGD sludge disposal research, 8:33042 (RA;US)
Goldie, C.H., High current multi-megavolt ion accelerators, 8:34278 (BA;US)
Goldin, A., *See* Crawford, E.J., 8:34508
Goldman, M., Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA;US)
See Sigmond, R.S., 8:34702
Goldring, G., *See* Faibis, A., 8:34344
Goldstein, D.A., *See* Feldman, I., 8:34489
Goldstein, H., Parasitic absorption and leakage corrections for $MnSO_4$ baths, 8:34383 (J;US)
Goldstein, J.C., Saturation of hot CO_2 by short 10.6 μm laser pulses, 8:34856 (J;US)
Goldstein, M., Note on correlated sampling in Monte Carlo, 8:33721 (RA;IL)
Note on correlated sampling in Monte Carlo, 8:33722 (RA;IL)
Goldstein, M.L., *See* Matthaeus, W.H., 8:34684
Gomes, F.M., National Energy Balance: recent evolution and perspectives, 8:33846 (RA;BR;In Portuguese)
See de Oliveira, A., 8:33626
Goncalves, D., Costs comparison of electric energy in Brazil, 8:33625 (RA;BR;In Portuguese)
Gondhalekar, P.M., Mass loss from astronomical objects. RAL workshop on astronomy and astrophysics, 8:34692 (R;GB)
Gonen, O., Orientation and energy transfer in chlorophyll monolayers diluted with hexadecane. Fluorescence and sensitized fluorescence, 8:34188 (J;IL)
Gong, E.L., *See* Nichols, A.V., 8:34485
Goodknight, C.S., National Uranium Resource Evaluation: intermediate-grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado, 8:33176 (R;US)
Goodman, J.W., Evidence for a suppressor cell in short-term bone marrow cultures, 8:34495 (RA;US)
Goods, S.H., Slow-strain-rate testing of 2.25Cr-1Mo in molten-nitrate salt, 8:33969 (R;US)
Goosman, D.R., Comparison of the SANDYL Monte-Carlo code calculations of 20.9-MeV bremsstrahlung with published experimental data, 8:34861 (R;US)
Gopalsami, N., Feasibility study of acoustic sensors for slurry-level measurements in coal-liquefaction systems, 8:32942 (R;US)
Gopych, P.M., *See* Sotnikov, V.V., 8:34539
Gordon, B., *See* Fujita, E., 8:34130
Gordon, B.M., Sensitivity calculations for multielemental trace analysis by synchrotron radiation induced X-ray fluorescence, 8:34061 (J;NL)
Gordon, H.T., *See* Hart, K., 8:33502
Gordon, S., *See* Lee, P.C., 8:34199
Goth-Goldstein, R., Effect of chemical carcinogens on mammalian cells in culture, 8:34619 (RA;US)
Goto, S., Process for removal of heavy-metal ions from waste water, 8:33944 (TG;US)
Gottschling, J.D., *See* Daniel, P.L., 8:34257
Gough, R., Design of a dedicated heavy ion accelerator for radiotherapy, 8:34317 (R;US)
Gouldin, F.C., Flow process in combustors, 8:34233 (R;US)
Gove, H.E., *See* Litherland, A.E., 8:34341
Grabmayr, P., *See* Yamanouti, Y., 8:34813
Grace, J.B., Effects of size and growth rate on vegetative reproduction in Typha, 8:33360 (J;DE)
Graeber, P., *See* Renger, G., 8:34582
Graham, R.H., UCG-SDB, where do we go from here, 8:32988 (RA;US)
Granelli, W., Energy Reeds. Part 4., 8:33337 (R;SE;In Swedish)
Grant, I.S., *See* Douglass, D.A., 8:33658
Grant, R.J., Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station, 8:33027 (RA;US)
Grauch, R.I., Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R;US)
Gray, W.J., Study of the oxidation of graphite in liquid water for radioactive waste storage applications, 8:34046 (J;GB)
Graybeal, D.L., *See* Hagman, J.T., 8:33497
Green, G.H., *See* Schoenau, G.J., 8:33523
Green, G.P., *See* Muzio, L.J., 8:33047
Green, K.A., *See* MacCarthy, J.E., 8:34886
Green, L., *See* Sucov, E.W., 8:34914
Green, M.I., LBL Magnetic-Measurements Data-Acquisition System, 8:34314 (R;US)
Green, W.L., *See* Jones, M.S. Jr., 8:33373
Greene, E.F., Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J;NL)
See Connolly, M.S., 8:34161
Greenland, A., *See* Shipman, H. Jr., 8:33393
Greenspan, E., Alternate pathways for the nuclear energy economy in Israel, 8:33815 (RA;IL)
Griest, W.H., *See* Jenkins, R.A., 8:34402
Griffith, J.K., *See* Tobey, R.A., 8:34641
Griffith, W.L., Pilot microscreen separation of Sclerotium rolfsii biomass and broth, 8:33136 (J;US)
Grigoriev, Yu.V., *See* Bakalov, T., 8:34839
Grimes, S.M., *See* Yamanouti, Y., 8:34813
Grimm, R.C., *See* Izzo, R., 8:34907
Grimm, W., *See* Arlt, R., 8:34844
Grisham, L.R., *See* Mikkelsen, D.R., 8:34904
Gritton, E.C., Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC) central station, 8:33288 (RA;US)
Groll, M., *See* Prenger, F.C., 8:34231
Gromulski, J., Specifications and design of a laminar-flow isothermal drop tube furnace for studies of pulverized fuel combustion., 8:33089 (R;SE)
Grondzik, W.T., Earth coupled cooling techniques, 8:33918 (J;US)
Grop, S., *See* Nygren, I., 8:33601
Grote, P.B., OTEC power applications to deep ocean mining, 8:33376 (RA;US)
Grover, J.R., Management of plutonium contaminated waste, 8:33237 (B;US)
Grubbs, R.H., *See* Straus, D.A., 8:34096
Gruber, J.O., Point system: a simple design tool, 8:33459 (J;US)
Gruen, D.M., *See* Pellin, M.J., 8:33988
Gruenbaum, F.A., Limited-angle problem in tomography and some related mathematical problems, 8:34962 (R;US)
Grula, E.A., Isolation and screening of Clostridia for possible use in microbially enhanced oil recovery, 8:33109 (RA;US)
Grula, M.M., Microbial interactions with polyacrylamide polymers, 8:33120 (RA;US)
Grunder, H., *See* Selph, F., 8:34290
Grupper, A.R., *See* Arifov, P.U., 8:34536
Gschneidner, K.A. Jr., *See* Ito, T., 8:34001
Gudenau, H.W., *See* Guntermann, K., 8:32978
Gudiksen, P.H., ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I, 8:34406 (R;US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II, 8:34407 (R;US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III, 8:34408 (R;US)
Guenther, A., Investigation of flow bed models for hydrogenating coal gasification, 8:32959 (R;DE;In German)
Guerin, D.A., Perception of thermal comfort, 8:33473 (J;US)
Test results: textiles selected for direct gain passive buildings, 8:33478 (J;US)

Guerin, M.R., *See* Jenkins, R.A., 8:34402
Guerra-Santos, L., Growth and biosurfactant production of a bacteria in continuous culture, 8:33105 (RA;US)
Guetlich, P., *See* Bergkamp, M.A., 8:34183
Guilbeault, B.D., 1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R;US)
Guillet, J.E., *See* Kilp, T., 8:34180
Gul, M., *See* Baratta, A.J., 8:33742
Gundlach, P., Neurological aspects of mercury intoxication, 8:34625 (R;DE;In German)
Gunn, R.D., Fundamental research needs in underground coal gasification, 8:32987 (RA;US)
See Britten, J.A., 8:32992
See Levie, B.E., 8:32980
Guntermann, K., Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA;US)
See Kurth, M., 8:32984
Gupta, C., *See* Connolly, M.S., 8:34161
Gupta, S.K., *See* Narasimha Murthy, K.H., 8:34850
Gur, Y., Sensitivity of computed integral parameters to the neutron width of the lowest U-238 resonance, 8:33720 (RA;IL)
Gurley, L.R., *See* Halleck, M.S., 8:34490
Gusev, S.E., *See* Adamov, V.M., 8:34845
Gustafsson, A., *See* Eggwertz, S., 8:33607
Gustafsson, P., Spectrally selective films for IR-reflectance of lamp bulbs, 8:33972 (R;SE;In Swedish)
Gutekunst, K., *See* Noren, O., 8:33328
Gutnick, D.L., *See* Rosenberg, E., 8:33106
Gutsche, W., Stress of the drilling shaft in deep-well drilling, 8:33134 (R;DE;In German)
Gvildys, J., *See* Ma, D.C., 8:33741
Gyorffy, B.L., *See* Szotek, Z., 8:33956

H

Haas, H., Impact tests with fuel element cans, 8:34218 (R;DE;In German)
See Foelsner, W., 8:34932
Haber, I., *See* Bisognano, J., 8:34283
Haberger, K., Application and further development of ion implantation for very large scale integration. Pt. 2, 8:34243 (R;DE;In German)
See Ryssel, H., 8:34242
Hackam, R., *See* Raju, G.R.G., 8:34705
Hackman, J., Energy research in the mechanical forest industry 1980-1982. Energy consumption in product transport, 8:33928 (R;FI;In Finnish)
Hackman, R.J., *See* Haynes, D.D., 8:33177
Haefele, E.T., *See* Hill, D., 8:33235
Haeufgloeckner, H., *See* Schach, V., 8:33930
Haftka, R.T., *See* Adelman, H.M., 8:34235
Hagemann, R., *See* Renger, G., 8:34582
Hagman, J.T., Obermeyer headquarters and warehouse, 8:33497 (J;US)
Hagqvist, P., *See* Almloef, G., 8:33088
Hahn-Haegerdal, B., Bioconversion of cellulose to liquid fuel (ethanol) and energy related chemicals, 8:33332 (R;SE;In Swedish)
Haight, R.C., Applied uses of nuclear level densities, 8:34824 (R;US)
Haire, R.G., X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R;US)
See Peterson, J.R., 8:33958
Hakkarainen, E., *See* Svensson, J.E., 8:33806
Hakkila, P., Evalution of the research project 'Forest Energy', 8:33876 (R;SE)
Halbach, K., Permanent multipole magnets with adjustable strength, 8:34292 (R;US)
Hall, B.O., *See* Sucov, E.W., 8:34914
Hall, E.A., *See* Goodman, J.W., 8:34495
Hallanger, L.W., Capabilities and potential of the OTEC seacoast test facility, 8:33390 (RA;US)
Halleck, M.S., Histone variants and histone modifications in chromatin fractions from heterochromatin-rich Peromyscus cells, 8:34490 (J;US)
Hallenius, K.E., *See* Carlsson, O., 8:33602
Halliday, K.R., *See* Bitensky, M.W., 8:34487
Halperin, W., *See* Thun, M.J., 8:34603
Hamacher, M.E., Considerations on the management of wastes expected to be generated by the operation of Brazilian nuclear reactors, 8:33215 (RA;BR;In Portuguese)
Hamer, E., Application of modern surface analytical methods for the solution of problems of technical catalysts, 8:34089 (R;DE;In German)
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R;DE;In German)
Hamilton, B., Non-instrumented performance evaluation of 335 passive solar homes, 8:33414 (J;US)
Hamm, R.N., *See* Todo, A.S., 8:34855
Hamouda, I., *See* Adib, M., 8:34803
Han, S.J., Instability localized at the inner surface of an imploding spherical shell, 8:34929 (R;US)
Han Qi-zhi, *See* Sun Hong-zhon, 8:34889
Hand, R.E. Jr., *See* Tennant, R.W., 8:34606
Hankes, L.V., Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra, 8:34511 (R;US)
Hanks, R.W., Laminar-turbulent transition for flow in pipes, concentric annuli, and parallel plates, 8:34240 (J;US)
Hansen, D., *See* Aschwanden, T., 8:34699
Hanseth, E., *See* Leibowitz, L.P., 8:33543
Hanson, R.B., Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling, 8:34509 (J;US)
Hansson, G., Methane fermentations. End product inhibition, thermophilic methane formation and production of methane from algae, 8:33329 (R;SE)
Hansson, H.C., *See* Lannefors, H., 8:34399
Hargrove, O.W., *See* Colley, J.D., 8:33038
See Stewart, D.A., 8:33033
Harima, Y., *See* Kitazawa, H., 8:34827
Harloff, G.J., *See* Corlett, R.C., 8:32993
Harper, F.T., *See* Benjamin, A.S., 8:33774
Harrar, J.E., *See* Richardson, J.H., 8:34192, 8:34193
Harrington, R.M., *See* Ball, S.J., 8:33760
Harris, A.G., Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R;US)
Harris, L.D., *See* Harris, A.G., 8:33102
Harris, M.T., Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment, 8:32960 (R;US)
Harrison, L.D., *See* Alpen, E.L., 8:34597
Harrison, M.A., Mirror fusion. Quarterly report, July-September 1982, 8:34944 (R;US)
Harrison, R.E., *See* Davis, M.A., 8:33477
Harry, G.R., Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R;US)
Hart, K., Economic analysis of selected passive solar commercial buildings, 8:33502 (J;US)
Hart, M., *See* Grula, E.A., 8:33109
Hartle, R., Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R;US)
Hartwig, E.C., *See* Chupp, W., 8:34284
Harumoto, Y., 77kV new type all-in-one SF_6 gas-insulated switchgear, 8:33647 (RA;US)
Hasegawa, A., *See* Kikuchi, Y., 8:33691
Hass, M., *See* Faibis, A., 8:34344
Hassan, S.S.M., Microdetermination and pK/sub a/ measurement of some aliphatic amines using the copper-ion-selective electrode, 8:34082 (J;US)
Hassenzahl, W., *See* Gilbert, W., 8:34319
Hastings, D.E., Resonant ion transport in EBT, 8:34901 (R;US)
Hastings, S.R., Analysis of an attached greenhouse in a low insolation northern climate, 8:33448 (J;US)
Hatch, J.R., Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R;US)
Hattori, T., *See* Ishikawa, M., 8:34033
Hauschild, W., Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA;US)
Havens, V.C., *See* Alpen, E.L., 8:34597
Hawkins, R.H., *See* Stone, J.A., 8:33203
Hay, P.J., *See* Walker, R.B., 8:34168
Hayd, A., Calculation of turbulence phenomena in plasma focus dynamics using REDUCE, 8:34898 (R;DE)
Hayes, J., 6th national passive-solar conference, 8:33413 (B;US)
See Wilson, A., 8:33544
Hayes, R.W., Distributed resource management: deadlocks, 8:34979 (BA;US)
Hayes, T.L., *See* Maestre, M.F., 8:34056
Haynes, D.D., Geology, structure, and uranium deposits of the Marble Canyon $1^\circ \times 2^\circ$ Quadrangle, Arizona, 8:33177 (R;US)
Heaberlin, S.W., *See* Baybutt, P., 8:33819

Heames, T.J., Stirling-engine thermodynamic analysis: a users guide to SEAM1, 8:34262 (R;US)
Heath, D.C., *See* Bennett, D.E., 8:33757
Heath, R.T., *See* Francko, D.A., 8:34443
Heatherly, D.E., *See* Vallet, C.E., 8:33783
Heatherly, L. Jr., *See* Vallet, C.E., 8:33783
Hebenstreit, J.R., Status of the Cracow electrostatic accelerator project, 8:34332 (BA;US)
Heckendorn, F.M. II, DWPF process control, 8:33204 (R;US)
Heckler, R., *See* Hoepfinger, E., 8:33792
Hedges, K.A., *See* Foster, J.L., 8:33618
Hedman, G., *See* Eriksson, S., 8:33336
Hedrick, C.L., *See* Hastings, D.E., 8:34901
Hedvall, R., *See* Pettersson, H., 8:34416
Heerwage, D.R., *See* Emery, A.F., 8:33479
Heerwagen, D.R., *See* Emery, A.F., 8:33909
See Garbini, J.L., 8:33907
Heffner, R.H., *See* Schillaci, M.E., 8:34865
Hegerberg, R., *See* Lundgaard, L., 8:34035
Hegerl, U., Investigations on a cortisol-iodine-125-radioimmunoassay test system, 8:34531 (R;DE;In German)
Heibel, J.H., Radiotherapy of breast fibrosis, 8:34516 (R;DE;In German)
Helfritch, D.J., Spray dryer/electron beam removal of SO_2 and NO/sub x/ from flue gas. First technical progress report, 1 October 1981-1 October 1982, 8:33020 (R;US)
Helleboid, J.M., *See* Frick, G., 8:34340
Helman, J.S., Scattering of polarized low-energy electrons by ferromagnetic metals, 8:34721 (RA;BR)
Helton, J.C., Health effects associtated with unit radonuclide releases to the environment, 8:33249 (RA;US)
Henderson, R.W., *See* Richards, D., 8:33375
Henderson, T., *See* Voelker, F., 8:34288
Hendewerk, M., *See* Leygraf, C., 8:33260
Hendrie, J.C. Jr., *See* Spencer, F.E. Jr., 8:33878
Heng, G., *See* Letournel, M., 8:34272
Henning, R.J., Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R;US)
Henning, W., *See* DenHartog, P., 8:34339
Henricks, J.D., *See* Henning, R.J., 8:33071
Henzel, D.S., Proven reagent for high sulfur coal flue gas desulfurization, 8:33053 (RA;US)
Hepner, M., *See* Arasteh, D., 8:33913
Heran, W.D., *See* Senterfit, R.M., 8:33558
Herb, R.G., Accelerator design for 50 MV, 8:34279 (BA;US)
Herceg, J.E., *See* Krumpelt, M., 8:33882
Herman, M., *See* Tepel, J.W., 8:34849
Hermann, V., *See* Castleman, A.W. Jr., 8:34127
See Kay, B.D., 8:34120
Hermanns, K.E., Determination of expected breakage of raw coal muck by simulated operational stress with special regard to raw-material influence parameters, 8:33082 (R;DE;In German)
Hermes, R.E., *See* Morales, R., 8:34409
See Stampfer, J.F., 8:34068
Hernalsteen, P., *See* Frederick, G., 8:33681
Hershberg, E.L., *See* Thresher, R.W., 8:33592
Hertel, N.E., Measurements and analyses of neutron transport through iron, 8:34859 (J;US)
Hess, R.W., *See* Gritton, E.C., 8:33288
Hessberger, F., *See* Hoffman, S., 8:33219
Heusch, B., *See* Frick, G., 8:34340
Hibbard W.R. Jr., Assessing the role of coal in the world energy future, 8:33859 (RA;BR)
Hicks, N.D., Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA;US)
Hidemark, B., *See* Andersson, B., 8:33454
Higashi, K.K., Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems, 8:33611 (R;US)
Hightower, M.M., Effects of curing and aging on the triaxial properties of concrete in underground structures, 8:34044 (R;US)
Hilal, A.A., *See* Morsy, M.W., 8:34868
Hildebrand, C.E., Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants, 8:34617 (R;US)
See Tobey, R.A., 8:34641
Hildebrand, S.G., Environmental impacts program, 8:33066 (RA;US)
Hildebrandt, T., *See* Schmitz, K., 8:33827
Hildingson, O., *See* Pettersson, H., 8:34416
Hilfman, L., *See* Brubaker, I.M., 8:33138
Hill, D., Management of high-level waste repository siting, 8:33235 (J;US)
Hill, F.B., *See* Cheng, H.C., 8:34052
See Chevray, R., 8:34239
Hill, R.W., Large-block experiments in underground coal gasification, 8:32996 (R;US)
Hiller, M., *See* Walentowicz, R., 8:33299
Hillman, M., *See* Fujita, E., 8:34130
Hillstrom, K.E., *See* More, J.J., 8:34974
Hino, Y., Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J;US)
Hirose, M., *See* Asada, Y., 8:33649
Hirsch, J.J., Simulation of HVAC equipment in the DOE-2 program, 8:33893 (R;US)
Hirsch, K., Selection criteria on laser-detector systems for scattering-diagnostics of fusion-plasmas, 8:34896 (R;DE;In German)
Hirsch, T., *See* Becker, W.S., 8:33310
Hirschfeld, T., *See* Crawford, R.W., 8:34149
Hirschfeld, T.B., *See* Klainer, S.M., 8:34067
Hitzman, D.O., Petroleum microbiology and the history of its role in enhanced oil recovery, 8:33126 (RA;US)
Hnatowicz, V., Sensitivity limits in gamma-ray spectroscopy, 8:34374 (RA;CS)
Hodapp, E., *See* Newcomb, C., 8:33447
Hodges, L., Graphs of average monthly insolation at arbitrary tilt and orientation, 8:33280 (J;US)
Hodson, E.K., Adaptive Gaussian filtering and local frequency estimates using local curvature analysis, 8:34973 (J;US)
Hoeglund, C., Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane., 8:33351 (R;SE)
Hoegstroem, U., Calculation of sulfur precipitation on a national scale, 8:33062 (R;SE;In Swedish)
Hoepfinger, E., Embedding energy industry into economy, 8:33792 (R;DE;In German)
Hoffman, E.E., Application of composite heat transfer tubes in power plants, 8:33975 (J;US)
Hoffman, F.O., *See* Rohwer, P.S., 8:33739
Hoffman, S., Stopping of alpha-recoil atoms in silicon, 8:33219 (RA;IL)
Hoffmann, K., *See* Haberger, K., 8:34243
See Ryssel, H., 8:34242
Hoffmann, L., Some economic aspects of the penetration potential of advanced transformation processes for non-agricultural renewable energy, 8:33875 (RA;DE)
Hofmann, H.M., *See* Tepel, J.W., 8:34849
Hogan, J.F., Solar domestic hot water in Seattle: the relative effects of collector tilt and orientation of annual performance or Ma'am the roof is the least of your worries, 8:33431 (J;US)
Hoheisel, H., *See* Kiock, R., 8:34217
Hoisington, J.E., Testing and economical evaluation of U(IV) in Purex, 8:33183 (R;US)
Hojuyama, T., *See* Kikuchi, Y., 8:33691
Holland, J.M., Resistance of germ-free athymic nude mice to two-stage skin carcinogenesis, 8:34644 (BA;US)
Holland, P.M., *See* Castleman, A.W. Jr., 8:34121, 8:34127
Holland, R.E., Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J;US)
Hollander, E., Demonstrating energy-efficient developments, 8:33810 (J;US)
Holley, W.E., *See* Thresher, R.W., 8:33592
Holley, W.R., *See* Fabrikant, J.I., 8:34550
Hollinden, G., Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA;US)
Hollos, G., *See* Ben-Zvi, I., 8:34331
Holloway, L.J., Michigan residential heating oil survey, winter 1982/83. Final report, 8:33853 (R;US)
Holm, J., Turboexpanders for OTEC power plant (VA 8), 8:33385 (RA;US)
Holmes, H.F., Isopiestic studies of aqueous solutions at elevated temperatures. III. [(1-y)NaCl + $yCaCl_2$], 8:34139 (J;GB)
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J;GB)
Holt, R.A., *See* Cheadle, B.A., 8:33987
Holt, R.J., Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J;US)
Holt, W.H., *See* Singh, J.J., 8:34016
Holzl, R.A., *See* Stiglich, J.J., 8:34002
Honda, M., Deterioration of epoxy mold insulations due to voltage endurance, 8:34014 (RA;US)
See Ishikawa, M., 8:34033
Hones, E.W. Jr., Field-aligned currents near the magnetosphere boundary, 8:34696 (R;US)
Hong, L.D., *See* Kaeppeler, F., 8:34811
Hooper, R.G., *See* Muzio, L.J., 8:33047

Hoover, D.B., Telluric profile location map and telluric data for the Glamis Known Geothermal Resource Area, California, 8:33560 (R;US)
Hornak, J.P., *See* Fessenden, R.W., 8:34196
Hosea, J.C., *See* Hwang, D.Q., 8:34903
Hoskins, E.R., Status of geotechnical studies at the Texas A and M University in situ gasification trials, 8:32966 (RA;US)
Hosobuchi, Y., *See* Fabrikant, J.I., 8:34547
Hosoda, J., Identification and partial purification of the error-prone repair gene products of bacteriophage T4, 8:34559 (RA;US)
Houston, M.M., *See* Ruberg, K., 8:33534
Hovey, J.M., *See* Hwang, D.Q., 8:34903
Hovingh, J., Design considerations for direct-illumination-driven inertial-fusion reactors, 8:34948 (R;US)
Howard, J., *See* Yang, T.C., 8:34593
Howard, P.A., *See* Lorenz, J.J., 8:33399
Howard, T.C., *See* Place, W., 8:33894
Hoy, C.A., *See* Rupert, C.S., 8:34580
Hsiao, C., *See* Warren, N., 8:33575
Hsie, A., *See* Legator, M.S., 8:34640
Hsie, A.W., Need to develop a short-term Chinese hamster in-vivo specific-locus mutational assay, 8:34615 (R;US)
See Brimer, P.A., 8:34639
Hsu, T.C., *See* Hoisington, J.E., 8:33183
Hsuan, H., *See* Elder, G.B., 8:34900
Hsue, S.T., Hybrid chemical and nondestructive analysis technique, 8:34054 (R;US)
Huang, J.C., Adsorption of propane on activated carbon at 25°C, 8:34162 (J;GB)
Gas-solid chromatography of ethane on activated carbon at 25°C, 8:34163 (J;NL)
Huang, T., *See* Brodsky, S.J., 8:34788
Huang, T.T., Thermal stability of Cr_3O_2 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA;US)
Hudson, H.S., *See* Dabbs, J.R., 8:34689
Hudson, S.R., Proceedings of the eighth underground coal conversion symposium, 8:32961 (R;US)
Huebner, M., Design and testing of the measuring equipment for the detection of ^{71}Ge and ^{69}Ge within the gallium-solar-neutrino experiment, 8:34533 (R;DE;In German)
Huegel, D., *See* Baratta, A.J., 8:33742
Huesman, R.H., Improved sampling in positron emission tomography, 8:34546 (RA;US)
See Budinger, T.F., 8:34557
See Derenzo, S.E., 8:34378
See Friedland, R.P., 8:34543
Huettinger, K.J., Investigations on the influence of mineral matter of coals and cokes on the kinetics of gasification with hydrogen and water vapour, 8:33014 (R;DE;In German)
Huetzen, H., *See* Foerstel, H., 8:34667
Hughart, D., *See* Dosik, R.S., 8:33873
Hughes, D.A., Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R;US)
Hughes, M., *See* Goth-Goldstein, R., 8:34619
Hughes, R.C., Space-charge effects in irradiated Si_3N_4 films, 8:34384 (R;US)
Hughes, R.T., Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R;US)
Hulett, L.D., *See* Rosseel, T.M., 8:34063
Hull, J.R., Time dependence of ground heat loss from solar ponds, 8:33538 (R;US)
See Cole, R.L., 8:33548
Hulley, S.B., *See* Lindgren, F.T., 8:34058
Hume, J., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
Humphrey, A.E., *See* Whitman, D.L., 8:32990
Humphrey, J.A.C., *See* Chilukuri, R., 8:34238
Hurlbut, F.C., *See* Lucas, D., 8:34212
Hutson, R.L., *See* Schillaci, M.E., 8:34865
Hutzler, B., *See* Berger, G., 8:34028
Hwang, D.Q., Modeling of ICRF heating of a tokamak plasma, 8:34903 (R;US)
Hyatt, T., *See* Lau, A., 8:33530
Hyde, R.C., *See* Kaplan, S.M., 8:33048
Hyden, H., Heat storage in ground water, 8:33821 (R;SE;In Swedish, English)
Hylander, J., Influence of the harmonics in rotor current on the wave shape of the stator voltage in a double-fed winddriven induction generator, 8:33609 (R;SE)
See Carlsson, O., 8:33602
Hyman, J.M., Dynamic acceleration of nonlinear iterations, 8:34959 (R;US)

I

Ikeda, M., Actual cooling performances of underslab systems in Davis, California, 8:33418 (J;US)
Ikossi, P.G., *See* Snover, K.A., 8:34799
Ilberg, D., Review of the Rancho Seco Nuclear Generating Station Unit No. 1 auxiliary feedwater-system reliability analysis, 8:33764 (R;US)
Ilchev, G., *See* Bakalov, T., 8:34839
Im, K.H., Convective and radiative heat transfer in MHD radiant boilers, 8:33880 (J;US)
Imahori, Y., *See* Andrews, H.R., 8:34342
Inacker, O., *See* Hamer, E., 8:34089
Inaoka, K., *See* Asada, Y., 8:33649
Ingram, M.D., Ionic conductivity and the weak electrolyte theory of glass, 8:34144 (J;NL)
Isaacs, H.S., Zirconia fuel cells and electrolyzers, 8:33885 (BA;US)
Ishii, M., *See* De Jarlais, G., 8:33738
Ishikawa, M., Voltage-time characteristic of particle-initiated breakdown in SF_6 gas, 8:34033 (RA;US)
Iskander, S.K., *See* Sauter, A., 8:33765
Isoya, A., Baking procedure of the accelerator tube by means of low voltage arc discharge, 8:34275 (BA;US)
Itagaki, S., *See* Hino, Y., 8:34810
Itikawa, Y., *See* Ohyama, T., 8:34726
Ito, T., Heat capacities of LaDsub(x) (2.5 <= x <= 3) from 1 to 300 K, 8:34001 (J;CH)
Ivanov, A.S., *See* Akulov, V.V., 8:34265
Ivanov, R.N., *See* Anufriev, V.A., 8:34830
See Babich, S.I., 8:34841
Ives, W., *See* Siegel, M.M., 8:32974
Iwanzik, W., Effect of enhanced UV-B radiation on photosynthetic activity of barley seedlings and chloroplasts, 8:34583 (RA;DE)
See Tevini, M., 8:34648, 8:34658
Izzo, R., Reduced equations for internal kinks in tokamaks, 8:34907 (R;US)

J

Jack, T.R., Potential for use of microbes in the production of heavy oil, 8:33114 (RA;US)
Jacob, N., *See* Cooper, D.W., 8:33766
Jacobi, C., Large industrial gas turbine for medium and peak load service, 8:33617 (R;DE;In German)
Jaeger, E.F., *See* Hastings, D.E., 8:34901
Jaegers, M., Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths, 8:34522 (R;DE;In German)
Jahn, H., *See* Hauschild, W., 8:33644
Jakobsen, J.I., Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires, 8:33145 (R;NO)
James, H.R., Cleanup of UCG product gas, 8:32973 (RA;US)
James, W.M., R and D program for UCG in bituminous coals, 8:32985 (RA;US)
See Siegel, M.M., 8:32974
Janeva, N., *See* Bakalov, T., 8:34839
Jang, L.K., Investigation of the transport of bacteria through porous media, 8:33110 (RA;US)
Jansen, C.R., *See* Hankes, L.V., 8:34511
Janssen, A.J., Frequency and duration method for the evaluation of wind integration, 8:33598 (RA;DE)
Operating considerations in reliability modeling of wind-assisted utility systems, 8:33599 (RA;DE)
Statistical methods for the assessment of wind power integration into the electricity supply system, 8:33597 (RA;DE)
Jansson, P., TORVLINE - a digging system for peat evaluated from the point of national economy, 8:33076 (R;SE;In Swedish)
Jansson, S.A., Erosion and erosion-corrosion in fluidized bed combustor systems, 8:33093 (BA;US)
Jansby, D.L., *See* Micklich, B.J., 8:34934
Jayaraman, N., *See* Divers, E., 8:33077
Jenkins, R.A., Chemical characterization of the smokes of selected US commercial cigarettes: tar, nicotine, carbon monoxide, oxides of nitrogen, hydrogen cyanide, and acrolein, 8:34402 (R;US)
Jenkins, S.D., Utilization of FGD by-product gypsum, 8:33043 (RA;US)
Jenneman, G.E., Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA;US)
Jennings, J.K., Literature review of interaction of oxidized uranium species and uranium complexes with soluble organic matter, 8:34678 (R;US)

Jergman, K., Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R;SE;In Swedish)
Jernigan, T., *See* Liang, E.P., 8:34691
Jessinghaus, J., *See* Birnbreier, H., 8:33888
Jessup, D.A., *See* Capelle, G.A., 8:34386
Jeung, N., *See* Durbin, P.W., 8:34206
Jewell, W.T., Interconnection problems associated with small dispersed electric generators and inverter devices, 8:33651 (R;US)
Jindrich, K., Purification of primary circuit coolant of light water reactor with Wofatit RH cation exchanger, 8:33676 (RA;CS;In Czech)
Jirasek, V., *See* Prochazka, H., 8:34376
Joensson, O., Thermal cracking of tars and hydrocarbons by adding oxygen and steam, 8:33331 (R;SE;In Swedish)
Johansson, L.Y., Studies on iron and cobalt phthalocyanine catalysts for the electrochemical reduction of oxygen with special emphasis on their stability in acid electrolyte, 8:33884 (R;SE)
John, N., *See* Kramar, U., 8:34674
Johnson, B., *See* Nicklas, M., 8:33491
Johnson, B.M., Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R;US)
Johnson, B.R., *See* Emery, A.F., 8:33909
See Garbini, J.L., 8:33907
Johnson, C.E., *See* Johnson, G.K., 8:34137
Johnson, C.H., *See* Fowler, J.L., 8:34794
Johnson, C.K., Nonlinear polariton effects in the phenanthrene crystal, 8:34152 (J;NL)
Johnson, D.C., *See* Richardson, J.H., 8:34192, 8:34193
Johnson, D.O., *See* Carter, R.P., 8:33164
Johnson, D.R., Model energy audit procedure for the RCS program, 8:34460 (BA;US)
Johnson, G.K., Enthalpies of formation of SbF_5(l) and Sb_8S_9(c) and the high-temperature thermodynamic functions of Sb_2S_3(c) and Sb_2S_3(l), 8:34137 (J;GB)
Johnson, I., Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet, 8:33606 (R;SE)
Johnson, J., *See* Voelker, F., 8:34288
Johnson, J.L., *See* Anania, G., 8:34905
Johnson, L.R., Evaluation of options for freight carriers during a fuel crisis, 8:33924 (R;US)
Johnson, M.E., *See* Tadikamalla, P.R., 8:34971
Johnson, N., *See* McDonald, C., 8:33021
Johnson, R.H., *See* Hertel, N.E., 8:34859
See Koch, K.R., 8:33690
Johnson, S.S., *See* Li, T.K., 8:34055
Johnston, J., *See* Mortimer, R.K., 8:34502
Johnston, T.L., *See* Grondzik, W.T., 8:33918
Jolley, R.L., *See* Harris, M.T., 8:32960
Jones, B.M., Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters, 8:33173 (RA;US)
See Daughton, C.G., 8:33170, 8:33172, 8:33174
See Langlois, G.W., 8:33171
Jones, J.P., *See* Lendvai-Lintner, E., 8:33001
Jones, J.W., *See* Santhanam, C.J., 8:33061
Jones, K.A., Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R;US)
Jones, K.W., Atomic needs for ion beams, 8:34305 (RA;US)
See Johnson, B.M., 8:34697
Jones, L.H., Preferred orientation of guest molecules in low-temperature matrices: SF_6 in xenon, 8:34099 (J;NL)
Jones, M.M., *See* McIntosh, W.C. Jr., 8:33429
Jones, M.S. Jr., OTEC aluminum intergration studies, 8:33374 (RA;US)
OTEC and island industry synergy: the St. Croix case, 8:33373 (RA;US)
Jones, P.D., *See* Repko, J.D., 8:34635
Jones, V.T., Subsurface detection of retort gases from an underground coal gasification reactor in steeply dipping beds near Rawlins, Wyoming, 8:32979 (RA;US)
Joos, D.W., Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA;US)
Jordan, A.C., Buildings energy research: a bibliography. Publications of the Building Systems Division, 8:33901 (R;US)
Josch, M., *See* Arlt, R., 8:34844
Jose, J.G., *See* Ainsworth, E.J., 8:34598
Jouaire, J., *See* Berger, G., 8:34028
Jovanovic, S., Candidate samples for the earliest lunar crust, 8:34695 (BA;US)
Joy, T., Development of high gradient, high vacuum accelerator tubes at Daresbury, 8:34274 (BA;US)
Judkins, R.R., Chlorine transport and corrosion mechanisms in coal liquids, 8:33002 (BA;US)
Jung, J., Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R;US)
Jungblut, H., *See* Aschwanden, T., 8:34699

K

Kaeppeler, F., Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV, 8:34811 (R;DE)
See Beer, H., 8:34826, 8:34833
See Leugers, B., 8:34821
See Wisshak, K., 8:34814
Kaeppeler, H.J., *See* Deutsch, R., 8:34897
See Hayd, A., 8:34898
Kaeppeli, O., *See* Guerra-Santos, L., 8:33105
Kahl, W.K., *See* Borkowski, R.J., 8:33662
Kahlon, T.S., Sedimentation equilibrium of human low density lipoprotein subfractions, 8:34482 (RA;US)
See Lindgren, F.T., 8:34057, 8:34058
Kahn, A., *See* Williams, C.W., 8:33419
Kaim, R., *See* Ben-Zvi, I., 8:34331
See Faibis, A., 8:34344
Kaindl, G., *See* Chiang, T.C., 8:34114
Kaizerman, S., Drift-flux model flow-regime map of two-phase flows for COTHA, 8:33674 (RA;IL)
Kako, F., Interaction of ion-acoustic solitons in multi-dimensional space, 2, 8:34737 (R;JP)
Kalebin, S.M., *See* Anufriev, V.A., 8:34830
See Babich, S.I., 8:34841
Kalkwarf, D.R., *See* Silker, W.B., 8:33240
Kallaur, E., *See* Douglass, D.A., 8:33658
Kalnins, J.G., *See* Clark, D.J., 8:34320
Kalos, M.H., *See* Tobochnik, J., 8:34018
Kamal, J., *See* Hull, J.R., 8:33538
Kamei, T., *See* Kikuchi, Y., 8:33691
Kammerud, R.C., *See* Place, W., 8:33894
Kanda, Y., *See* Matsunobu, H., 8:34840
Kanert, W., *See* Beitner, M., 8:34385
Kanter, E.P., Proceedings of the workshop on atomic physics with fast heavy-ion beams, 8:34707 (R;US)
Kaplan, N., Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA;US)
Kaplan, S.M., Dry scrubbing at Northern States Power Company, Riverside Generating Plant, 8:33048 (RA;US)
Kaplan, S.N., *See* Perez-Mendez, V., 8:34379
See Schimmerling, W., 8:34313
Karczmar, G.S., New method for the study of energy metabolism in living cells using nuclear magnetic resonance, 8:34506 (RA;US)
Karim, D.P., *See* Nash, K.L., 8:34042
Karim, N.N.A., *See* Crichton, B.H., 8:34022
Karlsson, O., Reed harvesting Koeping, 8:33335 (R;SE;In Swedish)
Karlsson, T., Preparation and characterization of solar absorbing films on stainless steel, 8:33541 (R;SE;In Swedish)
Karney, C.F.F., *See* Hwang, D.Q., 8:34903
Karpinovitch, Z., *See* Eisen, Y., 8:34357
Kase, K.R., *See* Cooper, D.W., 8:33766
Kasha, H., *See* Leipuner, L.B., 8:34322
Kasha, M., *See* Sengupta, P.K., 8:34172
Kaster, B., *See* Reil, J., 8:33887
Kasturi, P., OTEC: estimating total systems benefits and costs, 8:33284 (RA;US)
Katalev, V.V., *See* Abramov, A.G., 8:34311
Kato, K., *See* Wen, C.Y., 8:33271
Kato, N., *See* Isoya, A., 8:34275
Katzer, J.R., *See* Moon, S.H., 8:34171
Kaufmann, H.E., *See* Peterson, D.L., 8:33561, 8:33562, 8:33563
Kaufmann, J., Solar access as an investment strategy for builders, 8:33315 (J;US)
Kaul, O., *See* Meyer, W., 8:34304
Kavchuk, V.N., Quadrupole polarizability of atoms and ions, 8:34725 (RA;SU;In Russian)
Kawada, H., *See* Yoshizawa, Y., 8:34211
Kawai, M., *See* Kitazawa, H., 8:34827
See Matsunobu, H., 8:34840
Kawarasaki, Y., *See* Ohkubo, M., 8:34820
Kay, B.D., Studies of gas-phase clusters: the solvation of HNO_3 in microscopic aqueous clusters, 8:34120 (J;NL)
See Castleman, A.W. Jr., 8:34121, 8:34127
Kaye, R.J., Analysis of linearized decoupled power-flow approximations

for steady-state security assessment, 8:33653 (R;US)
Analysis of linearized decoupled power-flow approximations for steady-state security assessment, 8:33656 (R;US)
Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach, 8:33654 (R;US)
Kazanas, D., *See* Protheroe, R.J., 8:34686
Keane, A.T., Non-stochastic effects of ^{226}Ra and ^{228}Ra in the human skeleton, 8:34585 (R;US)
Keddy, E.S., *See* Merrigan, M.A., 8:33692
Kedzierski, R., *See* Lau, A., 8:33437
Keefe, D., *See* Faltens, A., 8:34270
Keeley, J.T., *See* Greene, E.F., 8:34048
Keesee, R.G., *See* Castleman, A.W. Jr., 8:34121
Keiper, R., Experimental investigation of shock initiated methane-combustion near a wall, 8:33264 (R;DE)
Keiser, J.R., *See* Judkins, R.R., 8:33002
Keith, K.M., Regulation of OTEC energy and energy product equivalents, 8:33301 (RA;US)
State of Hawaii public sector OTEC program, 8:33304 (RA;US)
Kelley, M., Thermal interaction in a hybrid house, 8:33420 (J;US)
Kellie, J.D., Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV, 8:34801 (J;US)
Kelly, C.J., Performance of two passive domestic hot water systems, 8:33432 (J;US)
Kelly, E.J., Electrochemical behavior of titanium, 8:34174 (J;US)
Kelly, M.E., Current status of dry SO_2 control systems, 8:33044 (RA;US)
See Blythe, G.M., 8:33046
Kelman, B.J., Plutonium movements across the haemochorial placenta of the guinea pig, 8:34608 (BA;GB)
Plutonium movements across the haemochorial of the guinea pig, 8:34609 (BA;GB)
Kelmers, A.D., *See* Ball, S.J., 8:33760
Kemme, J.E., *See* Prenger, F.C., 8:34231
Kemppainen, H., *See* Auerkari, P., 8:33973
Kemppainen, M., *See* Cullen, W.H., 8:33680
Kenaga, M., *See* Grula, E.A., 8:33109
Kendrew, T., *See* Lihach, N., 8:33661
Kenna, W.B., Solid waste disposal system, 8:33193 (RA;US)
Kennedy, C.R., Coal slag-refractory compatibility studies: progress to date, 8:33009 (J;US)
See Kennedy, E.P., 8:34049
Kennedy, E.P., Dependence of strength on particle size in graphite, 8:34049 (BA;US)
Kennedy, W.N., *See* Atkins, J.M., 8:34040
See Rohlfs, A.F., 8:34024
Kestin, J., Thermal conductivity of mixtures of hydrogen with nitrogen, 8:34103 (J;DE)
Khastar, P., *See* Shamai, Y., 8:34363
Khoromanskij, S.M., *See* Pasechnik, M.V., 8:34537
Khristov, V.I., *See* Mikhajlov, M.N., 8:34377
Kiefer, J., *See* Zoelzer, F., 8:34579
Kienle, P., *See* Ulrich, A., 8:34228
Kiessling, R., Development of a stationary battery for high load with increased efficiency of load levelling, 8:33782 (R;DE;In German)
Kiggans, J.O. Jr., *See* Tennant, R.W., 8:34606
Kihara, M., Some properties of the symmetry axis in a superpostion of two Kerr solutions, 8:34883 (R;JP)
Kikuchi, Y., Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J;US)
See Matsunobu, H., 8:34840
Kilander, K., *See* Hakkila, P., 8:33876
Kilgroe, J.D., *See* Kelly, M.E., 8:33044
Killen, L., MEDEE 3: first results for Ireland and data collection. Final report, 8:33791 (R;XE)
Killian, K., *See* Cecil, F.E., 8:34381
Kilp, T., Photoprocesses in copolymers of methacrylophenone with methyl methacrylate: photodegradation and intramolecular energy migration, 8:34180 (J;US)
Kilpatrick, L.L., *See* Lee, L.M., 8:33202, 8:33205
Kim, D., *See* Baratta, A.J., 8:33742
Kim, J.E., Natural embedding of Peccei-Quinn symmetry in flavor grand unification, 8:34774 (R;XA)
Reason for SU(6) grand unification, 8:34775 (R;XA)
Kim, K.J., *See* Lambertson, G.R., 8:34316
Kim, Y.K., *See* Boley, C.D., 8:34909
Kimmich, G.A., Intestinal transport of sugar: the energetics of epithelial pump-leak systems, 8:34568 (BA;US)
Kimura, K., *See* Isoya, A., 8:34275
Kimura, M., Some optimization considerations in chopper inelastic neutron scattering experiments, 8:34866 (J;NL)
Kincaide, W.C., Advanced alkaline electrolysis systems for OTEC, 8:33378 (RA;US)
King, A.D., *See* Singer, M.E., 8:33115
King, R.J., Performance of an array of vertical dipoles over an inhomogeneous ground system, 8:34250 (R;US)
King, S., Solar siting and access protection in new development, 8:33312 (J;US)
Kiock, R., Generation of higher levels of turbulence in the test section of the High Speed Cascade Wind Tunnel Braunschweig for simulation of turbomachinery conditions, 8:34217 (R;DE;In German)
Kippehan, C.J., *See* Emery, A.F., 8:33479
Kippenhan, C.J., *See* Emery, A.F., 8:33909
See Garbini, J.L., 8:33907
Kirby, J., Missouri house, 8:33520 (J;US)
Kirchman, H., Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R;SE;In Swedish)
Kiriluk, A.L., *See* Razbudey, V.F., 8:34817
Kirk, B.L., *See* Rust, B.W., 8:33843
Kirkpatric, M.B., *See* Nadel, J.A., 8:34631
Kirsh, I.E., *See* Keane, A.T., 8:34585
Kiss, A., Bremsstrahlung characteristics and particle trajectories in inclined field tubes of alternating or spiraling transverse fields, 8:34276 (BA;US)
Kissner, F., Passive solar greenhouse retrofits: a precursor to an integrated biomass conversion system, 8:33524 (J;US)
Kitazawa, H., Gamma-ray production cross sections for MeV neutrons, 8:34827 (J;US)
Kivimaeki, J., *See* Hackman, J., 8:33928
Kjellstroem, B., *See* Kristofferson, L., 8:33877
Klainer, S.M., Fourier transform nuclear quadrupole resonance spectroscopy, 8:34067 (BA;US)
Klein, M.P., *See* Karczmar, G.S., 8:34506
Klein, P.D., *See* DeMark, B.R., 8:34078
Klein, S.A., Tabular data for the un-utilizability passive solar design method, 8:33460 (J;US)
See Beckman, W.A., 8:33452
See Erbs, D.G., 8:33470
Klein-Szanto, A.J.P., Dark cells in human oral leukoplakias, 8:34566 (J;DK)
Dark epithelial cells in preneoplastic lesions of the human respiratory tract, 8:34638 (J;US)
Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications, 8:34637 (J;US)
Klopfer, J., *See* Shamai, Y., 8:34363
Kluge, R.F., *See* Perkins, F.W., 8:34936
Klyukin, A.B., *See* Zajtsev, M.G., 8:34542
Knapp, R.M., *See* Jenneman, G.E., 8:33111
Knecht, A., Development of surface charges on epoxy resin spacers stressed with direct applied voltages, 8:33636 (RA;US)
Kniffen, D., *See* Fichtel, C., 8:34685
Knitter, H.H., New fission fragment detectors for cross section and angular distribution measurements at CBNM, 8:34382 (J;US)
Knoepfel, P., Formulation and implementation of air quality control programmes, 8:33801 (R;DE)
Knoll, A., Life cycle cost. Reliability optimization of a complex system, 8:33705 (RA;IL)
Kobayashi, K., *See* Isoya, A., 8:34275
Kobayashi, N., *See* Honda, M., 8:34014
Kobayashi, T., *See* Kitazawa, H., 8:34827
Kobrin, P.H., *See* Southworth, S., 8:34181
Koch, G.H., Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA;US)
Koch, K.R., Gamma-ray heating in the Fast Breeder Blanket Facility, 8:33690 (J;US)
Koch, T., Routine apparatus for marine ^{85}Kr-samples, 8:34468 (R;DE;In German)
Kocherygin, N.G., *See* Babich, S.I., 8:34841
Koebke, K., *See* Fite, J., 8:33702
Koetzle, T.F., *See* Fumagalli, A., 8:34135
Kofskey, M.G., *See* McLallin, K.L., 8:33948
Koiller, B., *See* Ferreira, E.M., 8:34722, 8:34781, 8:34878
Kokh, R., Investigation of the Moessbauer spectrum shape on coherent acoustic excitation, 8:34541 (RA;SU;In Russian)
Kolaczkowski, A.M., Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R;US)
Kolanoski, H., Two photon physics with the TASSO detector, 8:34749 (R;DE)
Kolar, W., *See* Hayes, J., 8:33413

Kolb, E.W., Astrophysics and grand unification, 8:34693 (BA;US)
Kolba, V.M., *See* Wolson, R.D., 8:33191
Kolesov, A.G., *See* Anufriev, V.A., 8:34829
See Babich, S.I., 8:34841
Kollmann, H., *See* Schmitz, K., 8:33827
Koltay, E., *See* Kiss, A., 8:34276
Kondrat'ev, N.A., *See* Esipov, A.A., 8:34474
Kong, R.L., *See* Raybourn, M.S., 8:34665
Konings, M., Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report, 8:33798 (R;US)
Koo, J., *See* Leontief, W., 8:33793
Kooi, F., *See* Mei, H.C., 8:34496
Kopczynski, J.P., *See* Hebenstreit, J.R., 8:34332
Korasil, C., Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA;US)
Koretsky, A.P., *See* Karczmar, G.S., 8:34506
Korinek, M., New trends in development of instrumentation for ion exchange purification of radioactive liquid wastes, 8:33220 (RA;CS;In Czech)
Kosel, T.H., *See* Fiore, N.F., 8:34003
Koss, B., *See* Friedland, R.P., 8:34543
Koszykowski, M.L., *See* Noid, D.W., 8:34732
Kourouklis, G., *See* Siomos, K., 8:34184
Kourouklis, G.A., Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J;US)
Koya, M., *See* Honda, M., 8:34014
Kozak, J.J., *See* Dung, M.H., 8:34202
See MacCarthy, J.E., 8:34886
Kozina, M.M., Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis, 8:33682 (R;US)
Kozlovskij, K.I., *See* Bespalov, D.F., 8:34310
Kozyrev, Yu.P., *See* Bespalov, D.F., 8:34310
Kramar, U., Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R;DE;In German)
Krantz, W.B., *See* Britten, J.A., 8:32992
See Gunn, R.D., 8:32987
See Levie, B.E., 8:32980
Krause, H.F., Velocity-selected molecular beam study of rotational excitation in the reaction $C + NO \rightarrow CN + O$, 8:34122 (J;NL)
Krause, R., Reliability and accuracy of mammography in the diagnosis of breast carcinomas, 8:34532 (R;DE;In German)
Krauss, R.M., Abnormalities in low density and high density lipoprotein subspecies in familial combined hyperlipidemia, 8:34483 (RA;US)
Coordinate changes in levels of serum low and high density lipoprotein subclasses, 8:34484 (RA;US)
Krauss, W., *See* Huettinger, K.J., 8:33014
Krebs, M., Future of synthetic fuels: a congressional view, 8:33861 (RA;US)
Kremers, J.A., Big buildings and passive solar energy, 8:33485 (J;US)
Kremsec, V.J., *See* Wolson, R.D., 8:33191
Kresin, V.Z., New adiabatic approach to the photodissociation of polyatomic molecules, 8:34731 (J;US)
Krey, T., *See* Meissner, R., 8:33554
Krigger, J., *See* McBride, J.R., 8:33522
Krishnan, R.P., Carbon utilization in fluidized-bed combustion systems, 8:34256 (R;US)
Kristofferson, L., Energy provision for the Seychelles. Producer gas and other opportunities, 8:33877 (R;SE)
Kriz, A., *See* Fric, Z., 8:33725
Krohn, B.J., *See* Patterson, C.W., 8:34106, 8:34132
Kromer, I.L., Parameters influencing the switching surge strength of transmission line air insulation, 8:33630 (RA;US)
Kroner, W.M., Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J;US)
See Bryan, H.J., 8:33912
Krumbein, A.D., Proposed fuel management scheme for once-through PWR with 20% enrichment, 8:33672 (RA;IL)
Krumpelt, M., Advanced fuel-cell concepts for the 0.1- to 100-MW range, 8:33882 (R;US)
Krzesniak, L., *See* Tomasek, M., 8:33259
Krzhivanek, M., *See* Bejshovets, V., 8:34268
Kubas, G.J., Chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I). A square planar SO_2-transition metal complex, 8:34140 (J;CH)
Kubo, R., Role of infrared phase factors in quantum electrodynamics, 8:34787 (R;JP)
Kubu, M., Effect of annealing on sensitivity of some thermoluminescent dosemeters to ^{60}Co gamma radiation, 8:34367 (RA;CS;In Slovak)
Kuehn, R.G., Field testing of PCB sorbent materials for use in outside capacitor areas, 8:34261 (RA;US)
See Whinnery, W.N., 8:33018
Kuffel, E., *See* Qiu, Y., 8:34025
Kugeler, K., HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R;BE;In German)
Kulkarni, S.V., *See* Coppa, A.P., 8:33779
Kulkarni, V., *See* Yamanouti, Y., 8:34813
Kulsetas, J., *See* Lundgaard, L., 8:34035
See Rein, A., 8:34036
Kung, H.H., *See* Cheng, W.H., 8:34006
See Liu, S.Y., 8:34008
Kunselman, L.V., Comparison of forward combustion gasification models, 8:32981 (RA;US)
Kunz, W.S., Thermal performance of the Peterson Residence: a double shell envelope house, 8:33422 (J;US)
Kunze, J.F., *See* Phetteplace, D.R., 8:33556
Kurator, W.G., *See* O'Neill, R.P., 8:33162
Kurdziel, E.P., *See* Wadsworth, F.L., 8:33743
Kurkowski, T.L., Overview of designs from the DOE Passive Commercial Buildings Program, 8:33503 (J;US)
Kurt, J.P., Testing of OTEC riser cable components and models, 8:33368 (RA;US)
See Roblee, L.H.S., 8:33370
Kurth, M., Influence of pressure-swinging on the simulation of underground coal gasification, 8:32984 (RA;US)
Kurth, R.E., *See* Baybutt, P., 8:33819
Kushilevski, A., *See* Faermann, S., 8:34360, 8:34362
Kusuda, H., *See* Uehara, H., 8:33392
Kusumoto, S., *See* Harumoto, Y., 8:33647
Kutina, F.J., *See* Benford, S.M., 8:33982
Kutscher, F.W., Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany, 8:33065 (R;DE;In German)
Kutschera, W., Measurement of the half-life of ^{60}Fe using the Argonne FN tandem-superconducting Linac system as an accelerator mass spectrometer, 8:34819 (R;US)
Negative ion beams of rare and radioactive isotopes, 8:34346 (BA;US)
Kuwahara, H., Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA;US)
Kuz'min, V.M., *See* Andrienko, V.B., 8:34538
Kuzmichev, V.E., Diffraction scattering of strongly bound system, 8:34755 (R;DE)
Kuznetsov, V.P., *See* Danilenko, V.N., 8:34473
Kvick, T., Comparison of wind measurements performed by SODAR and cup anemometer on mast, 8:33587 (R;SE;In Swedish)
Network for the measurement of wind energy at high masts, 8:33588 (R;SE;In Swedish)
Kwiat, D., About the efficiency of a detector and the escape probability function, 8:34355 (RA;IL)
Kytoe, M., *See* Ekman, E., 8:33080

L

Laane, C., *See* Wilner, I., 8:33261
LaBelle, S.J., Technology assessment of productive conservation in urban transportation. Final report, 8:33923 (R;US)
LaBranche, M.H., *See* Yurek, G.J., 8:33984
Lackey, M.E., *See* Krishnan, R.P., 8:34256
Lager, D.L., *See* Burke, G.J., 8:34887
LaHaye, J., *See* Vedel, J., 8:33324
Lai, W., Analyzed method for calculating the distribution of electrostatic field, 8:34298 (BA;US)
Choice of field patterns of the straight field accelerating tube and its optic characteristics, 8:34295 (BA;US)
Lakin, J.E., Road map to the stars: teaching an integrated approach to energy conserving design, 8:33911 (J;US)
See Millet, M.S., 8:33919
Lakshmanan, S.M., *See* Mathur, V.K., 8:32999
Lakshminarasimha, C.S., *See* Siddagangappa, M.C., 8:34700

Lalley, P., *See* Tennant, R.W., 8:34572
Lam, D.J., *See* Nash, K.L., 8:34042
Lamaze, G.P., *See* Kellie, J.D., 8:34801
Lambert, L., *See* Reichmuth, H., 8:33421
Lambertson, G.R., Slotted coax as a beam electrode, 8:34316 (R;US)
Lambiase, R.F., *See* Nawrocky, R.J., 8:34299
Lambrecht, R.M., *See* Crawford, E.J., 8:34508
Lamoreaux, G.H., Design of a redundant-load-path lifting fixture for the Clinch River Breeder Reactor Plant spent-fuel shipping cask, 8:34222 (R;US)
Lampe, F.W., *See* Blazejowski, J., 8:34190
Lampe, J., Study on metal fluoride products formation caused by the electric arc in SF_6, 8:34039 (RA;US)
Lancaster, H., *See* Schneider, H.R., 8:34286
Lancaster, H.D., High-performance control system for a heavy-ion medical accelerator, 8:34318 (R;US)
Lancaster, J.R. Jr., Biological paramagnetic center: octahedrally coordinated nickel(III) in the methanogenic bacteria, 8:34097 (J;US)
Lance, E.D., *See* Corbett, B.L., 8:33734
Langer, M., Development of ceramic automobile turbine engine components, 8:33947 (R;DE;In German)
Langer, W.D., *See* Singer, C.E., 8:34937
Langhoff, J., SRC II - demonstration plant project for synfuel production from coal in the USA, 8:32944 (R;DE;In German)
Langlois, G.W., Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA;US)
Lannefors, H., Composition of the aerosol of a clean air region. Final report, 8:34399 (R;SE;In Swedish)
Lapides, M.E., *See* Cordova, A.H., 8:33731
Lapp, D.E., *See* Samuel, E.A., 8:33045
Larocque, G., *See* Croce, P.A., 8:33165
Larsen, E.W., Bounds and maximum principles for the solution of the linear transport equation, 8:34857 (J;US)
Larsen, R., *See* Leipuner, L.B., 8:34322
Lasche, G.P., *See* Blink, J.A., 8:34947
Laseke, B.A. Jr., Trends in commercial application of FGD technology, 8:33024 (RA;US)
Laskowski, G., *See* Kiock, R., 8:34217
Last, G.V., Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site, 8:33244 (R;US)
Latour-Slowikowska, H., *See* Lampe, J., 8:34039
Lau, A., Residential heating and cooling loads and costs for the south, 8:33530 (J;US)
Short-term test for houses, 8:33437 (J;US)
Lau, C.W., *See* Argon, A.S., 8:33995
Laub, R.J., Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases, 8:34086 (J;DE)
Recent advances in optimization strategies: chromatography, electrochemistry, and spectroscopy, 8:34071 (J;US)
See Gelles, S.H., 8:34740
Lauer, E.J., *See* Prono, D.S., 8:34294
Laughlin, G.J., *See* Poeton, R.W., 8:33761, 8:33762, 8:33763
Laughlin, R., Effects of the water soluble fractions of oil from the tanker Sefir on the myside, Neonmysis integer, 8:33152 (R;SE)
Laughter, T., *See* Burns, L.K., 8:32994
Laul, J.C., Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J;CH)
Lavi, A., Sensitivity of OTEC product prices to financial parameters, 8:33291 (RA;US)
LaVigne, A.B., Thermal performance of an earth-sheltered passive solar residence, 8:33423 (J;US)
Lawrence, M.F., Domestic social and economic impacts of OTEC commercial development, 8:33286 (RA;US)
Lawson, J.E., Electrical/mechanical cable test machine design and operation, 8:33369 (RA;US)
Lazar, I., Microbial enhancement of oil recovery in Romania, 8:33122 (RA;US)
Leach, J.W., Building and marketing passive solar homes, 8:33495 (J;US)
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J;US)
Marketable passive solar housing design for merchant builders, 8:33493 (J;US)
Lebedev, V.M., *See* Andrienko, V.B., 8:34538
Lebedev, V.N., Radiation problems at superconducting high-intensity accelerators of high-energy protons, 8:34309 (RA;SU;In Russian)
Lebowitz, J.L., *See* Tobochnik, J., 8:34018
Lecuiller, M., *See* Goldman, M., 8:34037
Ledent, P., State of the Belgian-German experiment of underground gasification, 8:32975 (RA;US)
Lee, E., *See* Parry, G., 8:34498
Lee, J.D., *See* Endlich, R.M., 8:33589
See Moir, R.W., 8:34949
Lee, J.K., *See* Advani, S.H., 8:32976
Lee, L.M., Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R;US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R;US)
See Forrestal, M.J., 8:34225
Lee, M.C., Generation of a strong core-centering force in a submillimeter compound droplet system, 8:34911 (R;US)
Lee, M.L., *See* Smith, R.D., 8:34064
Lee, P.C., Resonance Raman of viologen radicals, 8:34199 (J;NL)
Lee, S., *See* Advani, S.H., 8:32976
Lee, S.M., *See* McWhinney, R.T., 8:33865
Lee, S.Y., *See* Spengler, C.J., 8:33979
Lee, W.H., *See* Collier, I.E., 8:34605
Lee, Y.S., *See* Ermler, W.C., 8:34119
Leemann, B., *See* Selph, F., 8:34290
Leep, D.A., *See* Van Brunt, R.J., 8:33640
Lefor, A., *See* McBride, J.R., 8:33522
Legator, M.S., Evaluation of the host-mediated assay and body fluid analysis. A report of the US Environmental Protection Agency gene-tox program, 8:34640 (J;NL)
Leggett, R.W., *See* Williams, L.R., 8:34102
Lehman, G.L., *See* Sklad, P.S., 8:34075
Lehner, H., Neurological aspects of lead intoxication, 8:34626 (R;DE;In German)
Lehnert, B.E., Constant-flow ventilation of apneic dogs, 8:34569 (B;US)
Leibowitz, L.P., Advanced solar thermal technology, 8:33543 (J;US)
Leiferman, G., *See* Shenhav, N., 8:34364
Leipuner, L.B., Plans for Brookhaven fastbus during the next $\pi \times 10^{16}$ nanoseconds, 8:34322 (J;US)
Leitl, A., *See* Pfeiffer, W., 8:34703
Lemke, E., *See* Hauschild, W., 8:33644
Len, L.K., Utilization of the reaction $^{10}B(d,n)\ ^{11}C$ as a high temperature deuterium plasma diagnostic, 8:34804 (J;US)
Lenchek, T., Passive solar retrofit: comparisons of computer simulated performance with monitored data, 8:33461 (J;US)
Lenchek, T.E., *See* Lerner, R.A., 8:33498
Lendvai-Lintner, E., Erosion experience at the EDS coal liquefaction pilot plant, 8:33001 (BA;US)
Leon, M., *See* Schillaci, M.E., 8:34865
Leonard, R.A., *See* Finn, P.A., 8:34918
Leone, S.R., *See* Nesbitt, D.J., 8:34148
Leontief, W., Production and consumption of non-fuel minerals to the year 2030 analyzed within an input-output framework of the US and world economy (techniques for consistent forecasting of future demand for major minerals using an input-output framework), 8:33793 (R;US)
Lepage, A., *See* Hamilton, B., 8:33414
Lepage, G.P., *See* Brodsky, S.J., 8:34788
Lepel, E.A., *See* Laul, J.C., 8:34065
Lerner, R.A., Solar retrofit of Vintage Auto Parts, Woodinville, WA, 8:33498 (J;US)
Leslkar, A.V., *See* Ingram, M.D., 8:34144
Leslie, R.P., Passive solar retrofit analysis tool, 8:33451 (J;US)
See Bryan, H.J., 8:33912
Lester, W.A. Jr., *See* Kresin, V.Z., 8:34731
Lesuer, D.R., Field evaluation of tank track-pad failures, 8:34214 (R;US)
Letournel, M., Different way to consider a pulsed beam, 8:34297 (BA;US)
Up-grading of Strasbourg MP-10: results of the first step (13 to 16 MV), 8:34272 (BA;US)
Vivitron: new design for an electrostatic accelerator. Second step of the up-grading of the Strasbourg MP-10 (16 MV - 18 MV), 8:34277 (BA;US)
Leugers, B., KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J;US)
Levanon, H., *See* Gonen, O., 8:34188
Leventhal, J.S., *See* Jennings, J.K., 8:34678
Levie, B.E., Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA;US)
Levine, S.R., Thermal barrier coatings, 8:34005 (BA;US)

Levis, A.H., Decisionmaking organizations with acyclical information structures. Technical report, 8:34476 (R;US)
Levy, A.V., Corrosion-erosion-wear of materials in emerging fossil-energy systems, 8:33976 (B;US)
Erosion of metal alloys and their scales, 8:33978 (BA;US)
Metal corrosion in oil shale retorts, 8:33169 (BA;US)
Levy, E., Passive solar construction handbook, 8:33486 (J;US)
Levy, L., *See* Tenforde, T.S., 8:34664
Lewandowski, R.J., *See* Renoud, W.J., 8:33026
Lewellen, L.R., Intracavity absorption line shape and the super-regen model, 8:34728 (J;NL)
Lewis, M.F., Atomization: the key to dry scrubbing at the Coyote Station, 8:33049 (RA;US)
Leygraf, C., Mg- and Si-doped iron oxides for the photocatalyzed production of hydrogen from water by visible light (2.2 eV ≦ h nu ≦ 2.7 eV), 8:33260 (J;US)
Li, T.K., Plutonium isotopic measurement for small product samples, 8:34055 (R;US)
See Ledent, P., 8:32975
Liang, E.P., Analyses of the Konus catalogue of gamma-ray bursts with the thermal synchrotron model, 8:34691 (R;US)
On the nature of 2 gamma bursts with spectral evolutions observed by the Konus experiment, 8:34690 (R;US)
Liang, S.C., Analytical chemistry in the People's Republic of China, 8:34053 (R;DE;In German)
Libby, D.O., *See* Soden, J.E., 8:34259
Lichas, P., *See* Williams, C.R., 8:33132
Lietzke, M.H., *See* Petrovic, C., 8:34111
Lifshitz, A., Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R;US)
Lihach, N., New tools to cut labor costs, 8:33661 (J;US)
Likhachev, V.P., *See* Pasechnik, M.V., 8:34537
Lilley, D.G., Investigations of flowfields found in typical combustor geometries, 8:34234 (R;US)
Lillywhite, L., *See* Lillywhite, M., 8:33482
Lillywhite, M., Commercial potential of passive solar energy technologies in the third world, 8:33482 (J;US)
Neutral density transparent solar collector, 8:33547 (J;US)
Lin, H.B., Phase-fluctuation optical heterodyne spectrometer as a non-destructive detector for gas chromatography, 8:34077 (J;NL)
Lin, S.R., *See* Thresher, R.W., 8:33592
Linde, M., *See* Eggwertz, S., 8:33607
Lindemann, H., Assembler routines for process-control using the microcomputers Commodore cbm 3032/4032/8032, 8:34965 (R;DE;In German)
Lindemer, T.B., *See* Ball, S.J., 8:33760
Linden, O., *See* Laughlin, R., 8:33152
Lindenbaum, S.J., Glueballs in the reaction $\pi^- p \rightarrow$ phi phi n, 8:34746 (R;US)
Lindgren, F.T., Calibration of the analytic ultracentrifuge, 8:34057 (RA;US)
Plasma lipoprotein stability and standardization, 8:34058 (RA;US)
See Kahlon, T.S., 8:34482
See Krauss, R.M., 8:34484
Lindgren, H., Preliminary measurements of the waves at the Trubaduren lighthouse, 8:33583 (R;SE;In Swedish)
Lindle, D.W., *See* Southworth, S., 8:34181
Lindman, R., Methods of predicting loading and bending induced in an OTEC riser cable, 8:33367 (RA;US)
Lindner, W., *See* Stoeber, S., 8:33184
Linenberger, D., *See* Redebaugh, R., 8:33998
Ling, S.C., *See* Bhattacharya, R.S., 8:34045
Lints, M.C., Study of air infiltration in tight homes, 8:33910 (J;US)
Linville, B., Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R;US)
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R;US)
Lior, N., Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report, 8:33404 (R;US)
Liou, R., *See* Tennant, R.W., 8:34606
Lipsky, S., Ionization and excitation in non-polar organic liquids, 8:34185 (J;US)
Liska, G., Spondylarthritis Ankylopoietica and its treatment with thorium X. Follow-up examinations carried out on patients of the Orthopaedic University Clinics Wuerzburg (Universitaetsklinik Wuerzburg), 8:34529 (R;DE;In German)
Litherland, A.E., Rare isotope detection and dating with tandem accelerators, 8:34341 (BA;US)
Litinskij, A.V., *See* Andrienko, V.B., 8:34538
Little, C.A., *See* Fields, D.E., 8:33195
Liu, S.Y., Surface cation ratios of binary oxide solid solutions, 8:34008 (J;NL)
Liu, T.M., *See* Leibowitz, L.P., 8:33543
Livingston, A.E., Ultraviolet spectroscopy with highly-stripped heavy ions, 8:34710 (RA;US)
Livne, Z., Examination system of irradiated metallic fuel elements, 8:33729 (RA;IL)
See Munitz, A., 8:33728
Llacer, J., *See* Chatterjee, A., 8:34551
Lloyd, D.M., *See* Minchener, A.J., 8:33092
Loeb, H., Nuclear energy in space, 8:33693 (TJ;US)
Loevinger, R., Role of the standards laboratory in brachytherapy. Final report, 8:34554 (R;US)
Loftness, V., Critical users' manual for passive solar homes, 8:33476 (J;US)
Design implications and potentials of passive solar heating in higher density communities: the Lykovrissi Solar Village, 8:33512 (J;US)
Lofy, R.J., Study of zones of vacuum influence surrounding landfill gas-extraction wells, 8:33939 (R;US)
Lohr, A., *See* Bryan, H., 8:33920
Lombardo, C., *See* Newcomb, C., 8:33447
Lommel, L., *See* Tobias, C.A., 8:34594
Londe, H., *See* Ebbe, S., 8:34589
London, R.E., Asymmetric NMR spectra of weakly coupled nuclei: a common characteristic in the ^{13}C NMR spectra of [U-^{13}C] labeled molecules and in natural abundance proton-coupled ^{13}C spectra, 8:34157 (J;GB)
^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond, 8:34158 (J;GB)
Long, J.T., Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R;US)
Long, L.W., Environmental impacts of proposed toxic substances incinerator, 8:34254 (RA;US)
Long, M.H., *See* Croce, P.A., 8:33165
Longcope, D.B., *See* Forrestal, M.J., 8:34225
Lopetegui, J., *See* Sedlacek, G., 8:34219
Lopez, C.A., *See* Sherman, G. Jr., 8:33186
Lorenz, J.J., OTEC-1 heat exchanger test results, 8:33399 (RA;US)
Loth, R., *See* Whitaker, R., 8:33812
Lotker, M., Cost targets for OTEC: the impact of innovative financing, 8:33287 (RA;US)
Lou, Y.L., *See* Tong, Y.T., 8:33632
Louie, K.B., *See* Marks, S.M., 8:33553
Louis, J.F., Modeling of fluidized-bed combustion of coal. Volume IV. AFBC transient models. Final report, 8:33086 (R;US)
Lowell, P.S., *See* Rhudy, R.G., 8:33034
Lubin, B.H., *See* Pennathur-Das, R., 8:34477
Lucas, D., Effects of transient combustion phenomena on molecular-beam sampling, 8:34212 (R;US)
Lucas, H.F., *See* Keane, A.T., 8:34585
Lucas, J.C.R., Nuclear class 1 piping stress analysis, 8:33746 (RA;BR;In Portuguese)
Ludlam, T., Semiconductor devices as track detectors in high energy colliding beam experiments, 8:34323 (J;US)
Track chambers for high luminosity, 8:34352 (R;US)
Ludwin, R.S., *See* Marks, S.M., 8:33553
Luerig, H.J., *See* Stoecker, H.M., 8:34258
Luft, R., *See* Milosevic, I., 8:34245
Lugar, T.W., *See* Samuel, E.A., 8:33045
Luke, W.D., *See* Zalkin, A., 8:34207
Lukierski, J., *See* Frydryszak, A., 8:34777
Luks, K.D., *See* MacCarthy, J.E., 8:34886
Lum, C., *See* Ebbe, S., 8:34589
Lundemo, C., Calculation of blade-data for the Hamilton standard structural analysis of the composite blade for the 18 meter diameter rotor and a comparison with FFA-calculation, 8:33605 (R;SE)
Constructional basis of the project NE 5061481 composite rotor of Kalkugnen, 8:33604 (R;SE;In Swedish)
See Eggwertz, S., 8:33607
Lunden, L., *See* Ahling, B., 8:33278
Lundgaard, L., Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA;US)
Lundgren, S., *See* Lundemo, C., 8:33604
Lwin, Y., *See* Cole, R.L., 8:33548
See Krumpelt, M., 8:33882

Lyman, J.T., *See* Fabrikant, J.I., 8:34547, 8:34591
Lyneis, C.M., *See* Clark, D.J., 8:34320
Lyon, W.S., Analytical Chemistry Division annual progress report for period ending December 31, 1982, 8:34059 (R;US)
See Bujdoso, E., 8:34062
Lytle, R.J., *See* Burke, G.J., 8:34887

M

Ma, D.C., Seismic response of large suspended tanks, 8:33741 (R;US)
Maartensson, A.G., Refrigeration of milk - heating of dwelling-houses. Experimental evidence, 8:33936 (R;SE;In Swedish)
Maas, D.J., *See* Baria, D.N., 8:33079
Maayouf, R.M.A., *See* Adib, M., 8:34803
Macario, F., *See* Baratta, A.J., 8:33742
MacCarthy, J.E., Variational approach to the statistical mechanics of hard discs and hard spheres, 8:34886 (J;GB)
MacDowell, S.W., Geometric formulation of supergravity, 8:34879 (RA;BR)
MacFarland, E.W., *See* Fabrikant, J.I., 8:34550
MacGill, R., *See* Abbott, S., 8:34271
Macgregor, R.R., *See* Crawford, E.J., 8:34508
MacInnes, D., *See* Teoh, H., 8:34013
MacInnes, J.D., *See* Jones, M.S. Jr., 8:33373
MacInnes, M.A., uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells, 8:34494 (R;US)
MacLaughlin, D.E., *See* Schillaci, M.E., 8:34865
MacLeod, M.C., *See* Selkirk, J.K., 8:34642
Maddux, A.S., *See* Richardson, J.H., 8:34192, 8:34193
Mader, L., *See* Wieder, A., 8:34244
Madey, R., *See* Huang, J.C., 8:34162, 8:34163
See Schimmerling, W., 8:34194
Maduemo, G.C., NELMA project. I. Objectives of the methodical aspects, 8:34280 (J;US)
Maeda, N., *See* Uehara, H., 8:33392
Maeda, T., *See* Isoya, A., 8:34275
Maerk, T.D., *See* Castleman, A.W. Jr., 8:34121, 8:34127
Maestre, M.F., Differential scattering of circularly polarized light by the helical sperm head from the octopus Eledone cirrhosa, 8:34056 (RA;US)
Magee, J.L., *See* Chatterjee, A., 8:34195
Magee, T., *See* Lenchek, T., 8:33461
Maggiora, G.M., *See* Yoffe, J.A., 8:34733
Magnuson, W.G. Jr., *See* Balch, J.W., 8:34251
Magpantay, J.A., Non-existence of extended physical states in the Schwinger model, 8:34770 (R;XA)
Magyary, S.B., *See* Lancaster, H.D., 8:34318
Mahajan, S., *See* Newcomb, C., 8:33447
Mahlmann, L.J., *See* Ainsworth, E.J., 8:34599, 8:34600
Mai, T.K., *See* Bakalov, T., 8:34839
Maier, E., Experimentals on the energy-deposition of fast neutrons in phantoms, 8:34534 (R;DE;In German)
Maier-Komor, P., Differences of amorphous and graphitized carbon foils in their stripper qualities, 8:34338 (BA;US)
See DenHartog, P., 8:34339
Maino, G., First and second chance fission calculations for actinides and related topics, 8:34838 (J;US)
Maischberger, K., *See* Ruediger, A., 8:34882
Makarewicz, M.A., Solvent extraction of polychlorinated biphenpyl, 8:33149 (RA;US)
Makowiecki, D., *See* Leipuner, L.B., 8:34322
Malatova, I., Use of Ge(Li) spectrometry in monitoring personnel and environment. I, 8:34368 (RA;CS;In Czech)
Maleas, D.T., *See* Esposito, M.S., 8:34504
Maletskos, C.J., *See* Cooper, D.W., 8:33766
Malick, F.S., *See* Sucov, E.W., 8:34914
Malik, N.H., *See* Safar, Y., 8:34867
Malloy, T.P., *See* Brubaker, I.M., 8:33138
Maloney, J., *See* Chen, B., 8:33424
Maloney, T.J., Photovoltaic/passive solar residential systems, 8:33364 (J;US)
Malvicini, C., Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R;US)
Malyshev, I.F., Design parameters of a multipurpose cyclotron, 8:34267 (RA;SU;In Russian)
Mamantov, G., *See* Petrovic, C., 8:34111
Mamrack, M., Multistage skin tumor promotion: involvement of a protein kinase, 8:34645 (BA;US)
Mancuso, A., Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R;US)
Maneschy, J.E., *See* Lucas, J.C.R., 8:33746
Manganaro, S., *See* Carrara, G., 8:33629
Manickam, J., *See* Izzo, R., 8:34907
Manley, R., Estimate of OTEC costs and electric market potential, 8:33290 (RA;US)
Manley, R.N., Review of OTEC energy cost calculations, 8:33283 (RA;US)
Mann, R., *See* Mullaney, P.F., 8:34556
Manning, P.E., *See* Silence, W.L., 8:33960
Manning, R.G., *See* Root, J.W., 8:34209
Mansfield, B.K., *See* Selkirk, J.K., 8:34642
Mansur, L.K., Relationships of irradiation creep to swelling implicit in the theories of these processes, 8:33957 (R;US)
Manteuffel, T.A., *See* Hyman, J.M., 8:34959
Manzel, R., Power ramp experiments with mixed oxide (UO_2/PuO_2) fuel rods, 8:33727 (R;DE;In German)
See Schlemmer, F., 8:33667
Manzo, L., Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods, 8:34633 (R;US)
Marcheske, M., Donohue Corporate Office Headquarters: a cost effective energy conscious design, 8:33517 (J;US)
Marcus, R.A., *See* Noid, D.W., 8:34732
Marfaing, Y., Polycrystalline CdTe thin-film solar cells. Production by triode sputtering and short-distance transmission. Final report, 8:33325 (R;XE;In French and English)
Mariano, L.A., *See* Lucas, J.C.R., 8:33746
Marin-Lafleche, A., *See* Meriaux, S., 8:33308
Marina, J., OTEC utility users council 2000 A.D. market, 8:33394 (RA;US)
Puerto Rico and the Puerto Rico Electric Power Authority OTEC commitment, 8:33306 (RA;US)
Mariner-Volpe, B., *See* O'Neill, R.P., 8:33162
Marino, R.A., *See* Klainer, S.M., 8:34067
Mariscotti, M.A.J., *See* Ferreira, E.P., 8:34329
Marks, S.M., Seismic monitoring at The Geysers Geothermal Field, California, 8:33553 (R;US)
Marks, T., *See* Hsue, S.T., 8:34054
Marlow, W.H., Lead aerosol Brownian collision rates at normal and elevated temperature: theory, 8:34098 (J;US)
Marmion, D.M., *See* Aiken, R. L., 8:34070
Marode, E., *See* Bastien, F., 8:34736
Maron, N., A2900 meta assembler user manual, 8:34968 (R;US)
Marquis, R.E., Barobiology of deep oil formations, 8:33119 (RA;US)
Marsh, S.F., *See* Hsue, S.T., 8:34054
Marshall, W.L., Amorphous silica solubilities. VI. Postulated sulfate-silicic acid solution complex, 8:34100 (J;US)
Martin, B., *See* Carroll, J.T., 8:34321
Martin, D., *See* Klein-Szanto, A.J.P., 8:34637
Martin, D.S. Jr., Optical properties of linear chain haloamine platinum complexes, 8:34110 (BA;US)
Martin, G.B., *See* Drehmel, D.C., 8:33050
Martin, I.F., *See* Golbeck, J.H., 8:34492
Martin, L.C., *See* Yee, J.H., 8:34249
Martin, L.F., Ocean Thermal Energy Conversion: the evolution of an industry through regulation, 8:33298 (RA;US)
Martin, M., Results of a retrofit sunspace testing program, 8:33526 (J;US)
Martin, P.M., *See* Tobias, C.A., 8:34594
Martinez, H.E., *See* Merrigan, M.A., 8:33692
Martinez, M.J., Radionuclide transport code development in support of nuclear waste storage investigations, 8:33245 (R;US)
Martinuzzi, S., *See* Vedel, J., 8:33324
Maruyama, M., JAERI tandem accelerator facility, 8:34327 (BA;US)
Marzuk, P., *See* Connolly, M.S., 8:34161
Mason, R.Z., *See* James, W.M., 8:32985
See Siegel, M.M., 8:32974
Massaquoi, J.G.M., Study of the flame extinction process for coal under UCG conditions, 8:32982 (RA;US)
Massey, R.E., *See* Chu, F.Y., 8:34038
Massoth, F.E., *See* Muralidhar, G., 8:33139
Mathis, C.A., Radiotracer studies of unimolecular energy transfer, 8:34186 (J;US)
See Friedland, R.P., 8:34543
See Sargent, T. III, 8:34545
See Yano, Y., 8:34544
Mathis, R.C., *See* Bryan, H., 8:33920

Mathur, N.C., *See* King, R.J., 8:34250
Mathur, V.K., Synthesis gas production by the solar gas process, 8:32999 (J;US)
Matsuda, S., *See* Yoshizumi, T., 8:33643
Matsumiya, T., Modeling of continuous strip production by rheocasting, 8:33993 (J;US)
Matsunobu, H., Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J;US)
Matsuzawa, H., Spectroscopic study of low pressure fluorine-containing gas discharge, 8:34706 (RA;US)
Mattas, R., *See* Abdou, M., 8:34921
Mattas, R.F., Lifetime analysis of fusion-reactor components, 8:34919 (R;US)
Matthaeus, W.H., Stationarity of magnetohydrodynamic fluctuations in the solar wind, 8:34684 (R;US)
Matthes, H., Improved miniature sputter source MISS-4, 8:34348 (BA;US)
Mattiasson, B., *See* Hahn-Haegerdal, B., 8:33332
Mattson, J.E., Harvesting and utilization of wood for energy purposes, 8:33339 (R;SE)
Logging residue as fuelwood in forest farmers houses, 8:33344 (R;SE;In Swedish)
Mattsson, J.E., Joint IEA/IUFRO forestry energy workshop, 8:33338 (R;SE)
Matveev, S.V., *See* Danilenko, V.N., 8:34473
Mauersberger, K., *See* Meier, G., 8:34375
Maurel, J., Analytic formulation of electron distribution function from transport coefficients of electron swarm, 8:34701 (RA;US)
Maurer, M., *See* Hayd, A., 8:34898
Maurice, R.L. Jr., Flue gas desulfurization operations at Apache Station, 8:33040 (RA;US)
Mawson, K.H., Fine tuning solar access: calculators and computers as design tools, 8:33471 (J;US)
May, C.W., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
Mayberry, M.C., Specific heat of ^{3}He in the Fermi-liquid region, 8:34739 (R;US)
Mayer-Wehrstein, R., Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen, 8:34524 (R;DE;In German)
McBride, J.R., NCAT National Greenhouse Grant Program: a model for technology transfer, 8:33522 (J;US)
McCabe, L.P., Development of a load cell for mechanical testing in hydrogen, 8:33959 (R;US)
McCarron, R.L., Erosion/corrosion of turbine blades in coal combustion products, 8:33094 (BA;US)
Mccleskey, S.F., *See* Cushman, J.B., 8:34011
McCluney, R., Florida Ocean Thermal Energy Consortium, 8:33305 (RA;US)
McCormack, W.D., *See* Sula, M.J., 8:34418, 8:34427, 8:34428, 8:34429, 8:34430, 8:34431, 8:34435, 8:34456, 8:34458, 8:34459
McCown, P.J., Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA;US)
McCulley, M.T., *See* Bergeson, D.E., 8:33449
McDaniel, E.W., *See* Stinton, D.P., 8:33196
McDaniel, F.D., *See* Weil, J.L., 8:34805
McDaniels, F.D., Neutron scattering cross sections from (n,n') and (n,n'γ) methods: a comparison, 8:34812 (J;US)
McDonald, C., Regulation of solid wastes from coal-gasification and -liquefaction facilities: an analysis of Federal and selected state hazardous-waste management programs under RCRA, 8:33021 (R;US)
McDonald, C.L., Comparative analysis of conservation and passive solar strategies in multi-family residences, 8:33445 (J;US)
McDonald, C.W., Ion flotation of zinc using ethylhexadecyldimethylammonium bromide, 8:34081 (J;US)
McDonald, W.J., *See* Schimmerling, W., 8:34313
McDonell, W.R., *See* Benjamin, R.W., 8:33206
McDowell, R.S., *See* Patterson, C.W., 8:34106
McEllistrem, M.T., *See* McDaniels, F.D., 8:34812
McGlynn, S.P., *See* Meeks, J., 8:34165
McGregor, D.B., Tier II mutagenic screening of 13 NIOSH priority compounds: individual compound report, n,n-dimethylformamide, 8:34634 (R;US)
McGuire, E.J., *See* Mehlhorn, T.A., 8:34939
McGuire, S.A., NRC's limit on intake of uranium-ore dust, 8:33247 (R;US)
McInerney, M.J., Physiological types of microorganisms useful for enhanced oil recovery, 8:33108 (RA;US)
See Jenneman, G.E., 8:33111
McIntosh, W.C. Jr., Evolution of the air thermosiphon: toward production housing, 8:33429 (J;US)
McIsaac, I.S., *See* Hart, K., 8:33502
McKay, A., *See* Springham, D.G., 8:33125
McKay, D.C., Merged solar and meteorological data base for solar energy use, 8:33282 (J;US)
McKewan, T., Parametric sunspace/rockbed studies using CALPAS3, 8:33426 (J;US)
McLallin, K.L., Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine, 8:33948 (R;US)
McLaren, L.H., Radioactive waste processing and disposal: a bibliography, 8:33201 (R;US)
McLerran, L., Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R;US)
McNair, G.W., *See* Clark, L.L., 8:33188
McNerney, N.E., *See* Lawson, J.E., 8:33369
McPheeters, C.C., *See* Wolson, R.D., 8:33191
McRoberts, T.S., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
McTernan, E.M., *See* Owen, T.E., 8:33101
McWhinney, R.T., Comparing the effects of three nuclear power plants on future electricity prices, 8:33865 (R;US)
Mead, S.W., *See* Wang, F.T., 8:33070
Mecking, B., Accuracy of track reconstruction with inhomogeneous magnetic detectors, 8:34851 (R;DE)
Mecking, B.A., Photon induced reactions, 8:34791 (R;DE)
Meditch, J.S., Clock error models for simulation and estimation, 8:34963 (R;US)
Meeks, J., Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J;NL)
Mehlhorn, T.A., Current status of calculations and measurements of ion stopping power in ICF plasmas, 8:34939 (R;US)
Mehrhoff, T.K., Getter pumping speed measurements in the range 10^{-8} to 10^{-7} liters per second, 8:33262 (R;US)
Mehta, S., *See* Weinberg, I., 8:33330
Meier, E., Transport in rectangular quadrupole channels, 8:34281 (R;US)
Meier, G., NOI-6 N-15 analyzer, 8:34375 (RA;CS)
Meier, G.H., *See* Birks, N., 8:33977
Meier, M.M., Absolute measurement of the U-235 fission cross section from 0.2 - 1.2 MeV, 8:34843 (J;US)
Meinke, P., *See* Hayd, A., 8:34898
Meisel, D., *See* Lee, P.C., 8:34199
Meisels, S., *See* Gerholm, T.R., 8:33794
Meissner, R., Seismic reflection investigation of structural and lithologic parameters in the area of the Urach geothermal anomaly, 8:33554 (R;DE;In German)
Mel, H.C., Fundamental and applied studies on cell-membrane systems, 8:34496 (RA;US)
Melia, M.T., *See* Laseke, B.A. Jr., 8:33024
Mellegard, K.D., *See* Pfeifle, T.W., 8:34670
Menapace, E., *See* Maino, G., 8:34838
Mencher, F.M., OTEC energy transference via biomass: the pros and cons, 8:33379 (RA;US)
Menegassi, J., *See* Goncalves, D., 8:33625
Menju, S., *See* Honda, M., 8:34014
Mennigmann, H.D., Microorganisms as dosimeter for solar UV-radiation, 8:34578 (RA;DE)
Menzie, D.E., *See* Jenneman, G.E., 8:33111
Merdler, S., Prototype biosphere: adobe habitat, 8:33916 (J;US)
Meriaux, S., Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report, 8:33308 (R;US)
Merkle, D.J., Sunspaces in th rain belt, 8:33475 (J;US)
Meron, M., *See* Johnson, B.M., 8:34697
Merrigan, M.A., Development and test of a space-reactor-core heat pipe, 8:33692 (R;US)
Mertol, A., *See* Place, W., 8:33894
Merz, M.D., *See* Anderson, W.E., 8:33967
Mesmer, R.E., *See* Holmes, H.F., 8:34142

Messner, S., *See* Nakicenovic, N., 8:33824, 8:33825
Metz, P.D., *See* Andrews, J.W., 8:33890
See Teoh, H., 8:34013
Metz, W.C., *See* Hill, D., 8:33235
Meuser, R., *See* Gilbert, W., 8:34319
Meuser, R.B., *See* Taylor, C., 8:34289
Meyer, W., Dynamic deuteron polarization measurements performed in a new type of horizontal dilution cryostat, 8:34304 (R;DE)
Meyer-Schuetzmeister, L., *See* Holland, R.E., 8:34800
Meyerhof, W.E., Collisions of fast heavy ions: an overview, 8:34708 (RA;US)
Meyers, A.C. III, Passive solar energy retrofit for energy efficient housing in hot humid climates, 8:33531 (J;US)
Meyers, A.C III, Passive solar energy education and training courses, 8:33489 (J;US)
Mezga, L.J., Department of Energy Low-Level Waste Management Program, 8:33226 (RA;US)
Michalak, S., Development of heat exchangers for reheating scrubbed flue gas in a pilot plant, 8:33616 (R;DE;In German)
Michel, K.H., *See* Aiken, R. L., 8:34070
Micklich, B.J., Implications of polarized DT plasmas for toroidal fusion reactors, 8:34934 (R;US)
Mielke, E.W., Geon-type solutions of the non-linear Heisenberg-Klein-Gordon equation, 8:34768 (R;XA)
Mielke, U., CO diffusion capacity, 8:34623 (R;DE;In German)
Miglietta, F., *See* Ghirardi, G.C., 8:34869, 8:34871
Miglin, B.P., *See* Fang, W.C., 8:33985
Mikhaj, K., Analysis of sensitivity to the group constant variations in biological shield calculations by the extraction-diffusion method, 8:33733 (RA;SU;In Russian)
Mikhajlov, M.N., Streamer spectrometer for the study of rare neutron reactions, 8:34377 (RA;SU;In Russian)
Mikkelsen, D.R., High-energy tritium beams as current drivers in tokamak reactors, 8:34904 (R;US)
Miley, G.H., *See* Galambos, J., 8:34925
Miller, A.S., *See* Daniel, P.L., 8:34257
Miller, C.W., Validation of annual average air concentration predictions from the AIRDOS-EPA computer code, 8:34411 (RA;US)
See Rohwer, P.S., 8:33739
Miller, D.G., Series expansion methods for extracting ternary diffusion coefficients from Rayleigh interferometric data, 8:34138 (J;US)
See Rard, J.A., 8:34116
Miller, E.K., Comments on resolution of coherent sources incident on a circular antenna array, 8:34227 (J;US)
See Burke, G.J., 8:34887
Miller, E.P., Financing ocean thermal energy conversion projects with existing US maritime aids, 8:33292 (RA;US)
Miller, W.H., Question of mode-specificity in unimolecular reaction dynamics, 8:34178 (R;US)
Millet, M.S., Rainy day shading: the effect of shading devices on daylighting and thermal performance, 8:33919 (J;US)
See Lakin, J.E., 8:33911
Million, D.L., Programmer's guide to FFE: a fast front-end data-acquisition program, 8:34933 (R;US)
Mills, R.L., *See* Cromer, D.T., 8:34141
See Schiferl, D., 8:34051
Milo, G., Chemical carcinogen (hydrazine et al.) induced carcinogenesis of human diploid cells in vitro. Annual progress report 1 Sep 81-31 Aug 82, 8:34612 (R;US)
Milosevic, I., Development of a silicon gate CMOS technology with small structures, 8:34245 (R;DE;In German)
Milton, J.C.D., *See* Andrews, H.R., 8:34342
Min, O.K., *See* Advani, S.H., 8:32976
Minchener, A.J., Consideration of a possible mechanism for the corrosion of high temperature components in atmospheric coal fired fluidized bed combustors, 8:33092 (BA;US)
Development of a technique for measuring oxygen partial pressures within a fluidized bed, 8:33095 (BA;US)
Minchinton, A., *See* Kanter, E.P., 8:34707
Minges, G.P., *See* Higashi, K.K., 8:33611
Minkovitz, E., Influence of metallurgical variables on hydrogen assisted cracking of austenitic stainless steels, 8:33961 (RA;IL)
Minner, H.H., Fatigue strength improvement of welded high-strength steels StE 460 and StE 690 by TIG dressing, 8:33966 (R;DE;In German)
Minnich, A., Measuring system for high-power circuit breaker, 8:33627 (R;DE;In German)
Mints, A.Z., *See* Bespalov, D.F., 8:34310
Mirkin, L.D., *See* Klein-Szanto, A.J.P., 8:34637
Misner, T.L., *See* Cress, W.R., 8:33029
Misra, B., Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket, 8:34917 (R;US)
Mitarai, S., *See* Isoya, A., 8:34275
Mitchell, J.W., *See* Beckman, W.A., 8:33452
See Chen, Z., 8:33535
Mitteraner, J., Spectroscopic investigations of a field emission generated radiative zone: Mass spectroscopic measurements. Final Report, 8:33926 (R;US)
Miyake, Y., *See* Isoya, A., 8:34275
Miyano, K., Shear mechanical properties of free-standard liquid crystal films, 8:34154 (BA;US)
Miyata, E.S., *See* Arola, R.A., 8:33356
Mizumoto, M., *See* Ohkubo, M., 8:34820
Mobley, J.D., *See* Colley, J.D., 8:33038
Mock, W. Jr., *See* Singh, J.J., 8:34016
Moe, R.J., Impact of conservation measures on Pacific Northwest residential energy consumption. Final report, 8:33902 (R;US)
Moehwald, H., *See* Hamer, E., 8:33319
Moeller, D.D., *See* Hoover, D.B., 8:33560
See Senterfit, R.M., 8:33559
Moeller, M.P., *See* Poeton, R.W., 8:33761, 8:33762, 8:33763
Moeller-Kuhlmann, G., Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R;DE;In German)
Mohtadi, M., *See* Guntermann, K., 8:32978
Moir, R.W., Fusion-breeder-reactor design studies, 8:34949 (R;US)
Moise, H., *See* Hosoda, J., 8:34559
Mokrushin, A.D., *See* Zajtsev, M.G., 8:34542
Molinaro, F., *See* Nandi, R.K., 8:34094
Monahan, J.E., *See* Holland, R.E., 8:34800
Monda, M., *See* Fukuda, T., 8:34784, 8:34785
Monde, M., *See* Uehara, H., 8:33392
Mones, C.G., *See* Kunselman, L.V., 8:32981
Moneyhun, J.H., *See* Buchanan, M.V., 8:34396
Monsen, W.A., *See* Klein, S.A., 8:33460
Montano, P.A., *See* Vaishnava, P.P., 8:34095
Montgomerie, B., *See* Eggwertz, S., 8:33607
Monticello, D.A., *See* Izzo, R., 8:34907
Moon, S.H., Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts, 8:34171 (J;US)
Moore, C.J., *See* Selkirk, J.K., 8:34642
Moore, F., *See* Scofield, S.H., 8:33469
Moore, J., *See* Millet, M.S., 8:33919
Moore, J.A., *See* Rosen, J., 8:33456
Moore, L.T., Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R;US)
Mooring, F.P., *See* Holland, R.E., 8:34800
Moormann, R., REACT/THERMIX - a computer code to calculate graphite corrosion due to accidents in pebble-bed reactors, 8:33747 (R;DE;In German)
Morales, J.B., *See* Baratta, A.J., 8:33742
Morales, R., Air sampling and liquid chromatographic determination of ethylenimine, 8:34409 (J;US)
More, J.J., Testing unconstrained optimization software, 8:34974 (J;US)
Morello, A.S., Constructability of submarine bottom cables for OTEC power transmission, 8:33384 (RA;US)
Morgan, G.D., *See* Abdou, M., 8:34921
See Misra, B., 8:34917
Morgan, W.E., *See* Joos, D.W., 8:33041
See Rhudy, R.G., 8:33034
Morgenstern, M.H., *See* Rankin, W.L., 8:33730
Morliere, P., Evidence for the Br_3^- reaction with Ni(III) macrocyclic complexes: Br_3^- as a possible reducing agent, 8:34197 (J;CH)
Moroni, E.C., Disposable catalyst for coal liquefaction, 8:33008 (J;US)
Morrey, J.R., Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J;GB)
Morris, B.F., Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83, 8:33156 (R;US)
Morris, W.S., Thermosiphon floor heating system: design considerations and performance data, 8:33427 (J;US)
See Cook, J., 8:33428

Morrison, T.A., *See* Lawrence, M.F., 8:33286
Morschel, G., *See* Pohl, P., 8:33664
Morse, W., *See* Leipuner, L.B., 8:34322
Morsy, M.W., Scattering matrix element of the three body reactive collision, 8:34868 (R;XA)
Mort, D., *See* Newcomb, C., 8:33447
Mortimer, R.K., Genetic map of the yeast Saccharomyces cerevisiae, 8:34503 (RA;US)
Isolation and characterization of yeast DNA repair genes, 8:34502 (RA;US)
Morton, T.H., *See* Connolly, M.S., 8:34161
Mosch, W., *See* Hauschild, W., 8:33644
Moser, S.B., *See* Garvey, D.B., 8:33800
Moses, C.A., *See* Dodge, L.G., 8:34210
Moses, D.O., *See* LaBelle, S.J., 8:33923
Moses, V., Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA;US)
See Springham, D.G., 8:33125
Motta, M., *See* Maino, G., 8:34838
Motyka, T., Predicting transport requirements for radioactive-waste slurries, 8:33187 (R;US)
Mouzakis, J., *See* Loftness, V., 8:33476, 8:33512
Moyer, B.R., *See* Friedland, R.P., 8:34543
Moynihan, C.T., *See* Ingram, M.D., 8:34144
Mozer, J.D., Longitudinal unbalanced loads on transmission-line structures: documentation of computer programs BRODI2 and BROFLX, 8:33660 (R;US)
Mozley, E.C., Investigation of the conductivity distribution in the vicinity of a cascade volcano, 8:33557 (R;US)
Mueller, B., *See* Fite, J., 8:33702
Muenzer, H., Improvements of the Munich MP-tandem, 8:34273 (BA;US)
See Maier-Komor, P., 8:34338
Mulcahy, T.M., Measurement of crossflow forces on tubes, 8:33724 (R;US)
Mulera, T., *See* Perez-Mendez, V., 8:34379
Mulhall, J., *See* Phillips, T.R., 8:33270
Mulik, P.R., *See* Spengler, C.J., 8:33979
Mulkey, M.A., Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA;US)
Mullaney, P.F., Expectation values for low-resolution slit-scan flow prescreening: influence of nuclear shape and DNA density, 8:34556 (J;US)
Muller, R.H., *See* Farmer, J.C., 8:33963
Mungen, R., *See* James, W.M., 8:32985
See Siegel, M.M., 8:32974
Munitz, A., Transverse cracks in irradiated metal fuel element, 8:33728 (RA;IL)
See Livne, Z., 8:33729
Munnecke, D.M., *See* Jenneman, G.E., 8:33111
Munzenberg, G., *See* Hoffman, S., 8:33219
Muradyan, G.V., Measurement of U-235 absolute alpha value in the neutron energy range from 0.1 to 30 keV, 8:34837 (J;US)
Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei, 8:34796 (J;US)
Muralidhar, G., Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J;US)
Muralidharan, *See* Ferraudi, G., 8:34187
Murata, T., *See* Matsunobu, H., 8:34840
Muravitsky, A.V., *See* Razbudey, V.F., 8:34817
Murch, G.E., Monte Carlo study of diffusion in a model of an ordered absorbate, 8:34136 (J;GB)
Nernst-Einstein equation in high-defect-content solids, 8:34113 (J;GB)
Murdoch, J.B., Computer studies of multiple-quantum spin dynamics, 8:34881 (R;US)
Murnick, D.E., Laser spectroscopy with fast heavy ion beams, 8:34717 (RA;US)
Murphy, C.E., *See* Carlson, D.C., 8:34414
Murphy, M., *See* Stokstad, R.G., 8:34808
Murphy, R.W., Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site, 8:33565 (R;US)
Murray, J.N., *See* Kincaide, W.C., 8:33378
Mustaleski, T.M. Jr., *See* Stanaland, V.A., 8:33974
Muzio, L.J., Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA;US)
Myer, F.E., *See* Tennant, R.W., 8:34636
Myra, J.R., *See* D'Ippolito, D.A., 8:34938

N

N'Diaye, O., *See* Biggs, R.H., 8:34647
Nadel, J.A., Effects of air pollution on airway function. Final report May 80-May 81, 8:34631 (R;US)
Naesman, P., *See* Gerholm, T.R., 8:33794
Nagabhushana, G.R., *See* Sudarshan, T.S., 8:33638
Nagarajan, V., Morphology of corrosion of advanced heat exchanger materials in simulated FBC deposits, 8:33091 (BA;US)
Nagasaka, Y., *See* Kestin, J., 8:34103
Nagura, T., *See* Goto, S., 8:33944
Nagy, A.G., *See* Fujita, E., 8:34130
Nagy, Z., Comparison of computer curve-fitting and graphical data evaluations of the galvanostatic relaxation technique for the measurement of kinetics of electrode reactions, 8:34176 (J;GB)
Naidu, M.S., *See* Siddagangappa, M.C., 8:34700
Nakajima, Y., *See* Isoya, A., 8:34275
Nakanishi, K., Charge accumulation on spacer surface at dc stress in compressed SF_6 gas, 8:33637 (RA;US)
Nakaoka, T., *See* Uehara, H., 8:33392
Nakashima, T., *See* Isoya, A., 8:34275
Nakayama, T., Optical studies of hydronaphthyl radicals embedded in dihydronaphthalene crystal, 8:34204 (J;GB)
Nakicenovic, N., Solar energy futures in a Western European context, 8:33824 (R;DE;In German)
Solar energy futures in a Western European context, 8:33825 (R;DE;In German)
Nalewajek, D., *See* Williams, J.M., 8:34109
Nandi, R.K., Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J;US)
Napier, J.M., Polychlorinated biphenyl chemical destruction processes, 8:33150 (RA;US)
Narasimha Murthy, K.H., Simple parameterization for optical reaction cross sections, 8:34850 (J;US)
Narayan, J., *See* Bhattacharya, R.S., 8:34045
See Young, R.T., 8:33359
Narison, S., QCD sum rules of the Laplace transform type for the gluon component of the U(1)sub(A) meson mass, 8:34759 (R;XA)
Narita, T., *See* Smeltzer, W.W., 8:33981
Nasar, S., *See* Leontief, W., 8:33793
Nash, K.L., Effect of radiolysis on leachability of plutonium and americium from 76-101 glass, 8:34042 (R;US)
Natarajan, K., Experimental and analytical investigation of high temperature ignition of ethanol, 8:33274 (R;US)
Natarajan, P., *See* Chandrasekaran, K., 8:34146
Natesan, K., Corrosion behavior of materials in low- and medium-Btu coal-gasification environments, 8:33000 (BA;US)
Nawrocki, A.D., *See* Favard, G.J., 8:33439
Nawrocky, R.J., Pulsed power supply system for the fast quadrupoles in the AGS, 8:34299 (R;US)
Nefedov, V.N., *See* Anufriev, V.A., 8:34830
See Babich, S.I., 8:34841
Neil, V.K., Four-way rf beam separator, 8:34293 (R;US)
Nelms, W.M., Simultaneous removal of SO_2 and particulates from flue gas, 8:33054 (RA;US)
Nelson, D.H., *See* Green, M.I., 8:34314
Nelson, J.K., Corona stabilization in SF_6/N_2 mixtures under impulse conditions, 8:34734 (RA;US)
Nelson, L., *See* Martin, M., 8:33526
Nelson, M.A., *See* Norman, E.B., 8:34822
Nelson, W.R., *See* Rasmuson, D.M., 8:33772
Nereson, N.G., *See* Patterson, C.W., 8:34106
Nesbitt, D.J., Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J;NL)
Nesis, H.I., *See* Dolberg, D.S., 8:34560
Nettesheim, P., *See* Klein-Szanto, A.J.P., 8:34638
Netzel, T.L., *See* Bergkamp, M.A., 8:34183
Neuman, L.D., United Nations conference on new and renewable sources of energy, 8:33871 (RA;US)
Neumann, A.T., *See* Sherman, G. Jr., 8:33186
Newcomb, C., Study of solar and energy conserving houses in California: preliminary results, 8:33447 (J;US)
Newman, R.C., Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R;US)

Ranking of environments in stress-corrosion cracking, 8:33955 (R;US)
Newton, S., *See* Hollinden, G., 8:33030
Niarchos, D., *See* Shenoy, G.K., 8:34832
Nichols, A.V., Model precursors to high density lipoproteins, 8:34485 (RA;US)
See Krauss, R.M., 8:34483
Nicklas, M., Solar Spec, 8:33491 (J;US)
Nicklin, T., Further developments in the nickel/urania/α-alumina catalyst system, 8:33141 (J;GB)
Niederle, J., *See* Bayen, F., 8:34891
Nielsen, C.E., *See* Hull, J.R., 8:33538
Niemeakern, A., *See* Frick, G., 8:34340
Niemeyer, L., Surface discharge in SF_6, 8:33639 (RA;US)
Nikbakht, A., *See* Selkirk, J.K., 8:34642
Nikiforov, Eh.K., *See* Akulov, V.V., 8:34265
Nikodemova, D., *See* Spurny, F., 8:34372
Nikoopour-Deylami, A.H., Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R;AT;In German)
Niles, J.E., New York State passive solar design and retrofit competition, 8:33527 (J;US)
See Barron, J.J., 8:33490
Nilsson, D., *See* Skeppstedt, M., 8:33584
Nilsson, P.O., Rationalization conference, 1981. Logging research foundation, 8:33343 (R;SE;In Swedish)
See Mattson, J.E., 8:33339
See Mattsson, J.E., 8:33338
Nitta, T., *See* Kuwahara, H., 8:33645
See Nakanishi, K., 8:33637
See Yoshizumi, T., 8:33643
Nix, R.G., Open-loop transport of solar energy using natural-gas networks, 8:33354 (R;US)
Noble, E.C., *See* Rousse, R.E., 8:33496
Noblett, J.G. Jr., *See* Joos, D.W., 8:33041
Noe, J.W., Operation of the upgraded Stony Brook FN tandem, 8:34330 (BA;US)
Noid, D.W., Quasiperiodic and stochastic behavior in molecules, 8:34732 (J;US)
Noonan, J.R., High sensitivity surface crystallography: illustrative LEED analyses of Cu(100) and Ag(110), 8:33990 (J;GB)
Nordman, J.E., *See* Wiley, J.D., 8:34247
Noren, O., Technical equipment for the cultivation of energy forest, 8:33328 (R;SE;In Swedish)
Norling, R.D., OTEC legislative needs, 8:33303 (RA;US)
Norman, E.B., Half-life of ^{138}La, 8:34822 (R;US)
Norrman, J., *See* Frostell, B., 8:33327
Northcutt, K.J., *See* Rosseel, T.M., 8:34063
Norton, A., *See* Carroll, J.T., 8:34321
Nozzlopi, I., *See* Bujdoso, E., 8:34062
Novikov, A.I., *See* Stolyarova, E.L., 8:34540
Nowak, A.V., *See* Goldstein, J.C., 8:34856
Noyce, J.R., *See* Voilleque, P.G., 8:33744
Nunlist, R., *See* Richards, T., 8:34590
Nunn, G.N., OTEC subsea electrical power cable protection systems and technology, 8:33372 (RA;US)
Nuttall, L.J., Advanced water electrolysis technology for efficient utilization of ocean thermal energy, 8:33377 (RA;US)
Nygren, I., Wind power plant with a low speed electric generator, 8:33601 (R;SE;In Swedish)
Nygren, R.E., Overview of first wall/blanket/shield technology, 8:34915 (R;US)
Nylander, P.I., Sala 3.2 MW waste water heat pump measurements. Operation experiences. Report 1., 8:33903 (R;SE;In Swedish)
Nylen, N., Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J;US)
Nylinder, M., Scaling of fuelwood and fuelchips, 8:33341 (R;SE;In Swedish)
Storing of stump wood in a simulated environment, 8:33340 (R;SE;In Swedish)
Nylinder, P., Wood qualities and measurement of whole tree, 8:33342 (R;SE;In Swedish)

O

O'Connell, W.J., Subsystem seismic response uncertainty from sources in the seismic methodology chain, 8:33773 (BA;US)
O'Donnell, H.W., *See* Skonberg, E.R., 8:32968
O'Neill, R.P., Natural gas market through 1990, 8:33162 (R;US)
Oakes, T.W., Cost/benefit analysis: environmental protection projects, 8:34461 (RA;US)
Environmental laws and regulations: potential changes, 8:34419 (RA;US)
Oakeshott, D.F., Non-uniform field breakdown: engineering models, 8:33628 (RA;US)
Ober, B., *See* Friedland, R.P., 8:34543
Oberbeck, V.R., Mount St. Helens aerosol evolution, 8:34395 (R;US)
Oberdoerster, G., *See* Lehnert, B.E., 8:34569
Oberlin, J.C., *See* Letournel, M., 8:34272
Obermair, G.M., High time resolution wind data and the dynamic production function of WECS, 8:33586 (RA;DE)
Obkircher, B., *See* Hamer, E., 8:33319
Oblath, S.B., *See* Stone, J.A., 8:33203
Oei, T.D., *See* Janssen, A.J., 8:33597
Oerjasaeter, O., Risk analysis - safety program. Summary report, 8:33142 (R;NO)
Oettinger, C., Effect of reduced dependence on oil. Some economic long-sighted calculations, 8:33822 (R;SE;In Swedish)
Ogilvie, M., *See* Aronson, S., 8:34747
Ogunkeye, O.A., *See* McDonald, C.W., 8:34081
Ohkubo, M., Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV, 8:34820 (J;US)
Ohyama, T., Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy, 8:34726 (R;JP)
Okada, J.T., *See* Burke, G.J., 8:34887
Oliveira, H.A., *See* de Jesus Zerbini, E.C.G. de, 8:33845
Olsen, J.N., *See* Mehlhorn, T.A., 8:34939
Olsen, K.O., *See* Johnson, D.R., 8:34460
Olsson, G., *See* Bergendahl, L., 8:33579
Olsson, H., *See* Uteberg, E., 8:33333
Olszewski, M., Heat-pump desuperheaters for supplying domestic hot water - estimation of energy savings and economic viability for residential applications, 8:33900 (R;US)
Ondrejcin, R.S., Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R;US)
Ong, E., *See* Anderson, G.L., 8:32952
Onge, H.S., *See* Lawson, J.E., 8:33369
Onishchenko, L.M., *See* Dzhelepov, V.P., 8:34269
Oppenheim, A.K., *See* Lucas, D., 8:34212
Ortiz, N.R., Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1, 8:33221 (R;US)
Orttmann, C., Investigations on the assessment and optimization of solidifying weakly radioactive to medium radioactive wastes with hydraulic binders for a new storage technique in salt formations, 8:34472 (R;DE;In German)
Orvis, W.J., *See* Yee, J.H., 8:34249
Osipenko, B.P., *See* Alfimenkov, V.P., 8:34798
Osorio, R., Cluster-variation method for the triangular lattice gas, 8:34105 (J;GB)
Osten, R.J. Jr., *See* Strong, S.J., 8:33363
Osterberg, A.E., Passive solar retrofitting: generalizing from a case study, 8:33528 (J;US)
Osterweil, L.J., *See* Shafton, A.L., 8:34955
Ostop, R.L., *See* Samuel, E.A., 8:33045
Oswald, G.E., *See* Harris, M.T., 8:32960
Oswald, R.L., *See* Gruber, J.O., 8:33459
Otake, I., *See* Kikuchi, Y., 8:33691
Otten, J.A., *See* Tennant, R.W., 8:34606, 8:34636
Ottjes, J.A., Pressure losses in pneumatic transport. A model based on particle-wall interactions and particle density distribution, 8:34236 (R;US)
Ottorini, J.M., *See* Meriaux, S., 8:33308
Otvos, J.W., *See* Wilner, I., 8:33261
Ovadia, E., *See* Eisen, Y., 8:34357, 8:34358, 8:34361
See Faermann, S., 8:34359
Owen, R.C., *See* Fox, M.A., 8:34167
Owen, R.K., Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept, 8:34282 (R;US)
Owen, T.E., Permitting requirements and procedures in selected states with UCG potential, 8:33101 (RA;US)
Owicki, J.C., Biophysical studies of immune recognition, 8:34499 (RA;US)
Owzarski, S.L., *See* Moe, R.J., 8:33902
Ozadogru, Y.H., *See* Gershunov, E.M., 8:33400

P

Pacetti, M., *See* Fanchiotti, A., 8:33438
Palierne, M., *See* Goldman, M., 8:34037
Palkin, G.P., *See* Pasechnik, M.V., 8:34537

Palmiter, L., Annual load curves: a new design tool, 8:33458 (J;US)
Optimum conservation in direct gain homes: a new freedom for designers, 8:33504 (J;US)
Optimum conservation for northeast homes, 8:33908 (J;US)
Pamatmat, M.M., *See* Hanson, R.B., 8:34509
Pamidimukkala, K.M., Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R;US)
Panchal, C.B., *See* Lorenz, J.J., 8:33399
Pandey, S.N., Some aspects of gravitational waves in an isotropic background universe, 8:34876 (R;XA)
Papatheodorou, G.N., *See* Johnson, G.K., 8:34137
Papazoglou, I.A., *See* Ilberg, D., 8:33764
Pape, H., Main results of Annex III a, 8:33590 (RA;DE)
Pardo, R., *See* DenHartog, P., 8:34339
Park, G.L., *See* Stafford, R.W., 8:33600
Park, L.R., *See* Sudarshan, T.S., 8:33638
Park, W., *See* Izzo, R., 8:34907
Parkin, B., Solar homebuilders program: getting builders to build solar, 8:33317 (J;US)
Parks, C., *See* Connolly, M.S., 8:34161
Parr, P.D., Germination and growth effects of hexavalent chromium in Orocol TL (a corrosion inhibitor) on Phaseolus vulgaris, 8:34614 (RA;US)
Parry, G., Extracellular matrix influences on gene expression: the role of matrix components in modulating the differentiated phenotype of mammary epithelial cells, 8:34498 (RA;US)
Parry, R.F., Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R;US)
Parsby, M., How much is a biogas system to cost. Operational evaluation of biogas in agriculture, 8:33348 (R;DK;In Danish)
Pasechnik, M.V., Device for study on the (p, pn) reactions, 8:34537 (RA;SU;In Russian)
Patil, M., Practical and theoretical analysis of continuous selection of temperature layers in a hot water tank by an experimental tank and a simulation model, 8:33549 (R;DE;In German)
Patt, J., *See* Lesuer, D.R., 8:34214
Patterson, C.W., Interacting band analysis of the high-resolution spectrum of the $3\nu_3$ manifold of SF_6, 8:34132 (J;US)
Tunable laser diode study of the ν_3 band of SiF_4 near 9.7 μm, 8:34106 (J;US)
Patterson, L.K., *See* Gonen, O., 8:34188
See Morliere, P., 8:34197
Paul, R.A., Shortest route to commercialization of UCG, 8:32989 (RA;US)
Paulsen, L.L., *See* Sayre, J.A., 8:34017
Paulson, L.E., *See* Baria, D.N., 8:33079
Payne, A.C. Jr., *See* Kolaczkowski, A.M., 8:33767
Paz, A. Jr., Passive solar heating, cooling, and natural daylighting for a fire station in Springfield, Oregon, 8:33516 (J;US)
Peak, M.J., Role of DNA breakage in bacterial lethality caused by UV-B radiation, 8:34584 (RA;DE)
Peak, S.C., Improved transistorized ac motor controller for battery powered urban electric passenger vehicles, 8:33951 (R;US)
Peaslee, A.T. Jr., *See* Bohachevsky, I.O., 8:34931
Peek, J.M., *See* Mehlhorn, T.A., 8:34939
Pegg, D.J., *See* Compton, R.N., 8:34729
Pei, R.Y., *See* Gritton, E.C., 8:33288
Pelizzari, C.A., *See* Kimura, M., 8:34866
Pelletier, C.A., *See* Voilleque, P.G., 8:33744
Pellin, M.J., Laser fluorescence spectroscopy of molecular molybdenum isolated in rare gas matrices, 8:33988 (J;US)
Pelser, J., The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983, 8:33087 (R;NL)
Pendergast, M.M., Representativeness of calculated peak and annual average concentrations, 8:34413 (R;US)
Penland, J.R., *See* Foster, J.L., 8:33618
Pennathur-Das, R., Regulation of red blood cell production in human beings by erythropoietin, 8:34477 (RA;US)
Pepping, R.E., Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA;US)
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA;US)
Peraino, C., *See* Boernke, W.E., 8:34147
Perepezko, J.H., *See* Wiley, J.D., 8:34247
Perez-Mendez, V., Large-area non-crystalline semiconductor detectors, 8:34379 (R;US)
Perkins, E.H., *See* Holland, J.M., 8:34644
Perkins, F.W., Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R;US)
Perlow, G.J., *See* Ulrich, A., 8:34228
Perone, S.P., *See* Richardson, J.H., 8:34192, 8:34193
Perry, M.C., *See* Teramura, A.H., 8:34660
Persson, P.G., *See* Bjelm, L., 8:33552
Pesavento, G., *See* Baldo, G., 8:33631
Peters, C., *See* Gilbert, W., 8:34319
Peters, R.C., Art of daylighting, 8:33915 (J;US)
Petersen, E.L., Semiempirical calculation of excitation functions, 8:34828 (J;US)
Petersen, F.R., *See* Patterson, C.W., 8:34106
Petersen, K., *See* Moormann, R., 8:33747
Peterson, D.L., Principal facts for a gravity survey of the Double Hot Springs Known Geothermal Resource Area, Humboldt County, Nevada, 8:33561 (R;US)
Principal facts for a gravity survey of the Gerlach Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33562 (R;US)
Principal facts for a gravity survey of the Fly Ranch Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33563 (R;US)
Peterson, G., Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R;US)
Peterson, J.R., X-ray-diffraction study of californium metal to 16 GPa, 8:33958 (R;US)
See Haire, R.G., 8:34205
See Varlashkin, P.G., 8:34090
Peterson, K.I., *See* Castleman, A.W. Jr., 8:34121
Peterson, R., *See* Lucas, D., 8:34212
Petr, J., *See* Srbek, J., 8:33678
Petrovic, C., Electrical conductivity of molten mixtures of antimony(III) chloride-aluminum chloride and antimony(III) chloride-aluminum chloride-sodium chloride, 8:34111 (J;US)
Pettersson, B., *See* Nygren, I., 8:33601
Pettersson, H., Radon release from building material, 8:34416 (R;SE)
Peverini, R.L., *See* Young, I.T., 8:34975
Pevey, R.E., EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R;US)
Pfeffer, S., *See* Hollinden, G., 8:33030
Pfeiffer, W., Formative time lag in SF_6 and N_2, 8:34030 (RA;US)
Validity of streamer mechanism in compressed gases, 8:34703 (RA;US)
Pfeifle, T.W., Constitutive properties of salt from four sites, 8:34670 (R;US)
Pfender, E., *See* Huang, T.T., 8:33005
Pfestorf, W., *See* Matthes, H., 8:34348
Phalen, E., *See* Ebbe, S., 8:34589
Phetteplace, D.R., Geothermal Exploratory-Well Project: city of Alamosa, Colorado. Final report, September 1980-April 1983, 8:33556 (R;US)
Phillippi, M.A., *See* London, R.E., 8:34158
Phillips, N.E., *See* Mayberry, M.C., 8:34739
Phillips, T.R., Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1, 8:33270 (J;US)
Pickering, M.A., *See* Greene, E.F., 8:34048
Pickering, R.A., Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes, 8:34107 (J;NL)
Pierce, B.L., *See* Hill, D., 8:33235
Pigini, A., *See* Carrara, G., 8:33629
Pike, T.F., Commercial office daylighting demonstration, 8:33921 (J;US)
Pikelner, L.B., *See* Alfimenkov, V.P., 8:34798
Pikku-Pyhaeltoe, R., *See* Ekman, E., 8:33080
Pinder, J.E. III, *See* Carlson, D.C., 8:34414
Pine, A.S., *See* Patterson, C.W., 8:34132
Pinnekamp, F., *See* Niemeyer, L., 8:33639
Pire, B., *See* Ralston, J.P., 8:34745
Pitluck, S., *See* Chen, G.T.Y., 8:34549
Pittner, H., Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the

thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2, 8:33899 (R;AT;In German)
Pitzer, K.S., Relativistic modifications of covalent bonding in heavy elements. Calculations for TlH, 8:34123 (J;NL)
See Christiansen, P.A., 8:34101
See Ermler, W.C., 8:34119
Place, W., Roof apertures in office buildings, 8:33894 (R;US)
Platner, E.D., *See* Ludlam, T., 8:34352
Plemmons, R.J., *See* Funderlic, R.E., 8:34977
Pleshakova, R.P., *See* Bespalov, D.F., 8:34310
Plesser I., *See* Faibis, A., 8:34344
Plog, C., *See* Hamer, E., 8:34089
Plokhov, S.S., Hydrodynamic asymptotics of correlation functions with account of fluctuations, 8:34880 (RA;SU;In Russian)
Ploumen, P., Numerical calculation of three-dimensional long-time temperature fields using a special finite element method: the final storage of highly radioactive waste in salt rocks, 8:34463 (R;DE;In German)
Pocha, M.D., *See* Balch, J.W., 8:34251
Podesser, E., Development of a solar, absorption-type refrigerator - preliminary study in the course of scientific cooperation between Austria and India, 8:33405 (R;AT;In German)
Poeton, R.W., Interactive Rapid Dose Assessment Model (IRDAM): user's guide, 8:33761 (R;US)
Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2, 8:33762 (R;US)
Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3, 8:33763 (R;US)
Poettken, H.G., Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 1, 8:33931 (R;DE;In German)
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 2, 8:33932 (R;DE;In German)
Pohl, P., Improvement of plutonium recycling in boiling water reactors by irradiation experience and experiments, 8:33664 (R;DE;In German)
See Schlosser, G., 8:33703
Pollack, S.S., *See* Vaishnava, P.P., 8:34095
Pollock, E.L., *See* Alder, B.J., 8:34742
Pollock, E.O., Comparison of monitored passive buildings, 8:33425 (J;US)
Poltavtseva, V.P., *See* Esipov, A.A., 8:34474
Pond, B., *See* Newcomb, C., 8:33447
Pope, D.H., *See* Fliermans, C.B., 8:34561
Pope, R.B., *See* Lamoreaux, G.H., 8:34222
Popp, D.M., *See* Collier, I.E., 8:34605
Porsch, D., Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant, 8:33666 (R;DE;In German)
Porte, J.P., *See* Carroll, J.T., 8:34321
Porter, J.R., Hydrogen reduction of cobalt ferrite, 8:33992 (J;US)
Portugalov, Yu.I., *See* Abramov, A.G., 8:34311
Poruchikov, V.A., *See* Anufriev, V.A., 8:34830
See Babich, S.I., 8:34841
Pottier, M., *See* Gadelle, C., 8:32970
Poucher, F.W., *See* Lorenz, J.J., 8:33399
Powers-Risius, P., *See* Alpen, E.L., 8:34597
Praeg, W.F., Dual-aperature dipole with 2nd harmonic, 8:34308 (R;US)
Dual-frequency ring-magnet power supply with flat bottom, 8:34306 (R;US)
Preece, D.S., *See* Branstetter, L.J., 8:34673
Prenger, F.C., Performance limits for smooth-wall gravity-assisted heat pipes, 8:34231 (R;US)
Preston, A., *See* Templeton, W.L., 8:33236
Preston, R.J., Intrinsic factors that can affect sensitivity to chromosome-aberration induction, 8:34573 (R;US)
See Bender, M.A., 8:34607
Price, G.D., *See* Higashi, K.K., 8:33611
Price, K.R., *See* Sula, M.J., 8:34418, 8:34427, 8:34428, 8:34429, 8:34430, 8:34431, 8:34435, 8:34456, 8:34458, 8:34459
Prikhod'ko, V.I., *See* Plokhov, S.S., 8:34880
Prinke, G., *See* Rysael, H., 8:34242
Prioleau, J.C., *See* Ainsworth, E.J., 8:34599, 8:34600
Prior, M.H., Trapping of slow recoil ions: past results and speculations on the future, 8:34714 (RA;US)
Prochazka, H., Monitoring of deactivation stations in nuclear power plants, 8:34376 (RA;CS;In Czech)
Prochazka, J., *See* Prochazka, H., 8:34376
Prono, D.S., Simple method for damping transverse motion of a high intensity electron beam, 8:34294 (R;US)
Pronoko, P.P., *See* Bhattacharya, R.S., 8:34045
Protheroe, R.J., Origin of relativistic particles and gamma-rays in quasars, 8:34686 (R;US)
Prouza, Z., *See* Charvat, J., 8:34366
See Spurny, F., 8:34372
Przybylski, K., *See* Smeltzer, W.W., 8:33981
Pshenichnikov, G.P., *See* Esipov, A.A., 8:34474
Puchelt, H., *See* Kramar, U., 8:34674
Purser, K.H., *See* Litherland, A.E., 8:34341
Pusch, R.H., Thermal insulation blanket material. Final Report, 8:34221 (R;US)
Putman, W.J., *See* Geisheker, P.J., 8:33441
Pyde, S.E., Load management and the La Vereda passive solar community, 8:33417 (J;US)
Pyzh, V.M., Ambiguity of limiting transition from the Brans-Dicke theory to the Einstein theory, 8:34681 (RA;SU;In Russian)

Q

Qin, T., *See* Zhang, Z., 8:33121
Qiu, Y., High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane, 8:34025 (RA;US)
Quigg, C., Topics in quarkonium physics, 8:34758 (R;US)
Quivik, F.L., Comparison between passive solar and superinsulation retrofits, 8:33446 (J;US)
Qureshi, A.H., *See* Safar, Y., 8:34867

R

Raczka, R., *See* Furlan, P., 8:34769
Rade-Edel, J., *See* Manzo, L., 8:34633
Radkowsky, A., *See* Krumbein, A.D., 8:33672
Radmer, R., *See* Golbeck, J.H., 8:34492
Radtke, B., *See* Hoover, D.B., 8:33560
Raffoux, J.F., *See* Gadelle, C., 8:32970
Rahm, L., Pumping of peat slurry - at long distances, 8:33081 (R;SE;In Swedish)
Rai, A.K., *See* Bhattacharya, R.S., 8:34045
Raju, G.R.G., Sparking potentials calculated from the electron-molecule collision properties of gases, 8:34705 (RA;US)
Ralston, J.P., Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R;US)
Ramanujam, P.S., *See* Curtis, L.J., 8:34718
Ramirez, J.J., Study on the E-beam pulse width scaling for a 25-kilojoule KrF amplifier, 8:34229 (R;US)
Ramond, P., B-L violating supersymmetric couplings, 8:34765 (R;US)
Ramsdell, J.V., Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks, 8:34415 (R;US)
Randall, C.T., Hazards analysis of TNX Large Melter-Off-Gas System, 8:33213 (R;US)
See Motyka, T., 8:33187
Randers-Pehrson, G., *See* Yamanouti, Y., 8:34813
Randic, M., Herndon's structure-resonance theory. On the valence structure count for conjugated radical cations, 8:34164 (J;YU)
Randjbar-Daemi, S., Recursive formula for the evaluation of <psi'T-circumflexsub(μnu)(x)'psi> and its application in the semi-classical theory of gravity, 8:34875 (R;XA)
Randolph, J., Comparison of approaches for developing community energy plans, 8:33849 (J;US)
Rankin, W.L., Near-term improvements for nuclear power plant control room annunciator systems, 8:33730 (R;US)
Rankin, W.N., Evaluation of glass-contact materials for waste glass melters, 8:33207 (R;US)
Ranzinger, E., *See* Maier-Komor, P., 8:34338
Rao, K.R., *See* Santo, C.M.E., 8:34687
Rapaport, J., *See* Yamanouti, Y., 8:34813
Rapp, R.A., *See* Fang, W.C., 8:33985
Raptis, A.C., *See* Gopalsami, N., 8:32942
Rard, J.A., Isopiestic determination of the osmotic and activity coefficients of

aqueous CsCl, $SrCl_2$, and mixtures of NaCl and CaCl at 25°C, 8:34116 (J;US)
Rascati, R.J., *See* Tennant, R.W., 8:34636
Rasenick, M.M., *See* Bitensky, M.W., 8:34487
Rasmusen, D.M., Implementing quantitative analysis and its complement, 8:33772 (BA;US)
Rasmussen, J.O., *See* Frankel, K.A., 8:34751
Ratner, L.G., Recent developments at BNL, 8:34302 (R;US)
Rausand, M., *See* Bern, T.I., 8:33153
Ray, W. Jr., *See* Holland, R.E., 8:34800
Raybourn, M.S., Functional analysis of laser-induced ocular damage, 8:34665 (RA;US)
See Tenforde, T.S., 8:34664
Raymond, K.N., *See* Durbin, P.W., 8:34206
Razbudey, V.F., Total neutron cross section of ^{46}Sc at the 2 keV, 8:34817 (J;US)
Realo, Eh., *See* Kokh, R., 8:34541
Rechen, J., *See* Gilbert, W., 8:34319
Redebaugh, R., Thermoelectric refrigeration for temperatures below 100 K: A study of titanium seaquioxide, 8:33998 (R;US)
Reed, C.W., Transient breakdown in SF_6 gas-impregnated polymer film structures, 8:33648 (RA;US)
See Atkins, J.M., 8:34040
Reed, G.W. Jr., *See* Jovanovic, S., 8:34695
Rees, J.A., Elastic scattering data for electrons in attaching gases, 8:34698 (RA;US)
Reeves, B., CLIME: a climate analysis computer program, 8:33281 (J;US)
Reffo, G., *See* Leugers, B., 8:34821
Regan, J.D., *See* Collier, I.E., 8:34605
Regev, P., *See* Livne, Z., 8:33729
Rego, J., *See* Bazan, F., 8:33234
Reichenbach, T., Investigations of subclinical neurogenous damage of persons with chronic occupational exposure to lead and trichlorethylene, 8:34627 (R;DE;In German)
Reichert, H., *See* Beitner, M., 8:34385
Reichle, D.E., Global carbon cycle program, 8:34401 (RA;US)
Reichmuth, H., Novel analysis technique used in the Oregon passive monitoring project, 8:33421 (J;US)
Reil, J., Heating of domestic water by waste heat recovery from household refrigerating equipment, 8:33887 (R;DE;In German)
Reimers, R.M., Magnet coil system for a superconducting spectrometer (HISS), 8:34315 (R;US)
Rein, A., Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA;US)
See Lundgaard, L., 8:34035
Reiniger, C., Native self-reliance, 8:33313 (J;US)
Reinmuth, F., Reduction of the energy consumption of an existing building by replacement of the building facade, demonstrated at the office building of EWAG, Nuernberg, 8:33889 (R;DE;In German)
Renger, G., Effect of UV irradiation on the primary processes of photosynthesis, 8:34582 (RA;DE)
Reno, V., Thermosiphoning air panels: going with the flow, 8:33545 (J;US)
Renoud, W.J., Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA;US)
Repko, J.D., Effects of inorganic lead on behavioral and neurologic function. Final report, 8:34635 (R;US)
Revis, N.W., Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA;US)
Revus, D.E., *See* Jenneman, G.E., 8:33111
Reynolds, J.S., *See* Ubbelohde, M.S., 8:33483
See Wilmot, W.G., 8:33519
Rhee, S.J., Transpired solar air heaters. Volume 3. Effect of wall suction on laminar entrance flow with application to solar air heaters. Final report, 8:33540 (R;US)
Rhodes, P.H., *See* Saville, D.A., 8:34237
Rhudy, R.G., Full-scale utility flue gas desulfurization system characterization results, 8:33034 (RA;US)
See Blythe, G.M., 8:33046
Ribeiro, S.V.G., Design of a pressurized water loop heated by electric resistances, 8:33669 (RA;BR;In Portuguese)
Ricaud, C., *See* Frick, G., 8:34340
Ricci, R.A., *See* Signorini, C., 8:34326
Richard, J.L., *See* Wilson, J.L., 8:33383
Richard, P., X-ray spectroscopy with fast heavy-ion beams, 8:34709 (RA;US)
Richards, A.D., Phenol degradation in a three-phase fluidized-bed bioreactor, 8:33058 (R;US)
Richards, D., OTEC produced ammonia: an alternative fuel, 8:33375 (RA;US)
See Francis, E.J., 8:33387
Richards, P.M., *See* Schillaci, M.E., 8:34865
Richards, T., Nuclear magnetic resonance programs at Lawrence Berkeley Laboratory, 8:34590 (RA;US)
See Chen, G.T.Y., 8:34549
Richardson, J.H., Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J;NL)
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34193 (J;NL)
Richieri, G., *See* Mel, H.C., 8:34496
Richter, H.J., Radioimmunologic determination of testosterone and 5α-dihydrotestosterone in the plasma of women with hirsutism, 8:34525 (R;DE;In German)
Rickert, P., *See* Nash, K.L., 8:34042
Ridgely, G.C., *See* Baumann, N.P., 8:33736
Ridgeway, J.R., *See* Marina, J., 8:33394
Riechert, H., *See* Meyer, W., 8:34304
Riggs, J.B., *See* Massaquoi, J.G.M., 8:32982
Riley, B., *See* Sansone, P., 8:33430
Rill, R.L., Isolation and characterization of chromatin subunits, 8:34501 (BA;US)
Nucleosomes: composition and substructure, 8:34493 (BA;US)
Rimini, A., *See* Crisciani, F., 8:34872
See Ghirardi, G.C., 8:34869, 8:34871
Rind, W., Graphitic matrix materials for spherical HTR fuel elements, 8:33685 (R;DE;In German)
Risbud, S.H., *See* Bhattacherjee, A.P., 8:34047
Ritchie, R.H., Quantal aspects of the spatial resolution of energy-loss measurements in electron microscopy. I. Broad-beam geometry, 8:34073 (J;GB)
Rittenberg, A., *See* Wohl, C.G., 8:34750
Rizk, F.A.M., *See* Eteiba, M., 8:34032
Rizy, D.T., *See* Jewell, W.T., 8:33651
Rizzuto, J., *See* Pike, T.F., 8:33921
Rizzuto, J.E., *See* Lints, M.C., 8:33910
Roberge, R., *See* Newman, R.C., 8:33668
Roberts, L.E., *See* Dell, G.F., 8:34754
Roberts, W.L., *See* Laub, R.J., 8:34086
Robertson, J.B., *See* Cooper, D.W., 8:33766
Robinett, R.W., Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R;US)
Second Z in SO(10), 8:34766 (R;US)
Robinson, D.A., Life-cycle cost economic optimization of insulation, infiltration and solar aperture in passive solar houses, 8:33296 (J;US)
Robinson, G.E., *See* Baratta, A.J., 8:33742
Robinson, J.C., *See* Adelman, H.M., 8:34235
Robinson, J.P., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
Robinson, P.R., *See* Bamberger, C.E., 8:34108
Roblee, L.H.S., Testing of full scale prototype OTEC riser cables, 8:33370 (RA;US)
Rochelle, G.T., Buffer additives for limestone scrubbing: a review of R and D results, 8:33037 (RA;US)
Rodekohr, M.E., Model documentation: Short-Term Integrated Forecasting System Demand Model, 8:33855 (R;US)
Rodenbaugh, T., *See* Lihach, N., 8:33661
Rodgers, S.J., *See* Durbin, P.W., 8:34206
Rodnizky, Y., *See* Saphier, D., 8:33683
Rodriguez, A., Cell age distribution in multicell tumor spheroids, 8:34596 (RA;US)
Rofer-DePoorter, C.K., Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J;US)
Rogalski, W.W. Jr., *See* Francis, E.J., 8:33387
Rogers, M.L., *See* Finn, P.A., 8:34916, 8:34918
Rohlack, L.A., *See* Blythe, G.M., 8:33046
Rohlfs, A.F., Dielectric strength of SF_6 in divergent field configuration, 8:34024 (RA;US)
Rohr, G., *See* Brusegan, A., 8:34815
Rohrer, L., *See* Muenzer, H., 8:34273
Rohwer, P.S., Forecasting consequences of accidental release: how reliable are current assessment models, 8:33739 (R;US)
Roll, C.R. Jr., *See* Foster, J.L., 8:33618
Ron, M.Z., Production of nuclear fuel in Israel. Feasibility and justification, 8:33816 (RA;IL)
Root, J.W., Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons, 8:34209 (J;US)
See Mathis, C.A., 8:34186

Roots, R.J., *See* Tobias, C.A., 8:34594
Rose, J.C., *See* Harris, M.T., 8:32960
Rosen, J., Graphic method for predicting temperature swings, 8:33456 (J;US)
Heat mirror coatings for internal load dominated buildings, 8:33914 (J;US)
See Bryan, H., 8:33920
Rosenberg, E., Adherence of bacteria to hydrocarbons, 8:33106 (RA;US)
Rosenberg, M., *See* Rosenberg, E., 8:33106
Rosenblatt, J.A., *See* Lotker, M., 8:33287
Rosenblum, S.S., *See* Faltens, A., 8:34270
Rosner, J.L., *See* Robinett, R.W., 8:34766, 8:34767
Ross, P.N. Jr., Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA;US)
Hydrogen chemisorpton on Pt single crystal surfaces in acidic solutions, 8:34133 (J;NL)
Rosseel, T.M., Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J;CH)
Rossi, P., *See* Carroll, J.T., 8:34321
Roth, R., *See* Coppin, P.A.W., 8:33585
Rothenstein, W., *See* Aminpour, M., 8:33671, 8:33717
Rotundo, L., *See* McCluney, R., 8:33305
Rouland, O., *See* Konings, M., 8:33798
Rousse, R.E., Massachusetts Multi-Family Passive Solar Program: recent activities and findings, 8:33496 (J;US)
Roussel, R., *See* Kilp, T., 8:34180
Routt, K.R., Physical modeling of a glass melter designed for vitrification of defense waste, 8:33208 (R;US)
Rowe, M.D., *See* Hill, D., 8:33235
Ruberg, K., Detached earth cooling with radiant interior building elements, 8:33534 (J;US)
Rubin, H., Initial growth rate, population density, and cation content as limiting factors in the multiplication of nontransformed and transformed 3T3 cells, 8:34500 (BA;US)
Rubin, I.B., *See* Buchanan, M.V., 8:34396
Rudolf, T., *See* Leipuner, L.B., 8:34322
Ruediger, A., Gravitational wave detection by laser interferometry, 8:34882 (R;DE)
Rundo, J., Radon in homes and other technologically enhanced radioactivity, 8:34412 (R;US)
Runkle, G.E., Calculation of health effects per curie release for comparison with the EPA standard, 8:33250 (RA;US)
Runyan, J.E., *See* Merrigan, M.A., 8:33692
Runyan, R., *See* Hollinden, G., 8:33030
Rupert, C.S., Choice of the normalization wavelength for action spectra in polychromatic radiation dosimetry of UV-B, 8:34577 (RA;DE)
Influence of induced recovery processes on the response of cells to UV radiation, 8:34580 (RA;DE)
Ruppel, D., *See* Marcheske, M., 8:33517
Ruscic, B., *See* Randic, M., 8:34164
Rush, P., Marketing passive solar energy to the building industry, 8:33318 (J;US)
Ruskan, R.P., *See* Whitman, D.L., 8:32990
Russel, W.B., Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R;US)
Russell, H.H., *See* Grula, E.A., 8:33109
Russell, J.E., *See* Hoskins, E.R., 8:32966
Russell, L.B., Mammalian mutagenesis: future directions, 8:34505 (BA;US)
Rust, B.W., Modulation of fossil fuel production by global temperature variations, 8:33843 (J;GB)
Rutherford, W.M., Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J;US)
Ryabov, E.V., *See* Bespalov, D.F., 8:34310
Ryan, J.P. Jr., *See* Stone, J.A., 8:33203
Ryan, R., *See* Kubas, G.J., 8:34140
Ryk, L., *See* Carlson, R., 8:33085
Rymes, M., *See* Cecil, F.E., 8:34381
Rypar, V., Application of electromagnetic filter in water treatment in pressurized water reactor power plant, 8:33677 (RA;CS;In Czech)
Ryssel, H., Application and further development of ion implantation for very large scale integration. Pt. 1, 8:34242 (R;DE;In German)
See Haberger, K., 8:34243
Ryves, T.B., Cross section for the $^{56}Fe(n,p)$ reaction for 14.73 MeV neutrons, 8:34818 (J;US)

S

Sabbioni, E., *See* Manzo, L., 8:34633
Sabetta, F., *See* Fanchiotti, A., 8:33438
Sabine, B.J., *See* Holloway, L.J., 8:33853
Sabougi, M.L., Theoretical studies of slag exchange equilibria, 8:33013 (J;CA)
Saccomanno, G., *See* Klein-Szanto, A.J.P., 8:34638
Sachs, B., *See* Hamilton, B., 8:33414
Sachs, M., *See* McWhinney, R.T., 8:33865
Sadoff, A., *See* Schimmerling, W., 8:34313
Saedtler, E., Hierarchically structured identification and classification method for vibration control of reactor components, 8:34465 (R;DE;In German)
Safar, Y., Effect of grounded enclosure on the field distribution of rod-plane gaps, 8:34867 (RA;US)
Safonov, L.A., *See* Andrienko, V.B., 8:34538
Safonov, V.A., *See* Anufriev, V.A., 8:34829
See Babich, S.I., 8:34841
Sagues, A.A., Mechanisms of corrosion and alloy response in coal liquid systems containing chlorides, 8:33004 (BA;US)
See Sargent, G.A., 8:33003
Sah, R.C., *See* Lancaster, H.D., 8:34318
Saha, P., *See* Egely, G., 8:34230
Saied, M.M., *See* Abdel-Salam, M., 8:34735
Sakaji, R.H., *See* Daughton, C.G., 8:33170, 8:33172, 8:33174
See Jones, B.M., 8:33173
See Langlois, G.W., 8:33171
Salaita, G.N., *See* Woo, T.W., 8:34816
Salam, A., Gauge unification of fundamental forces, 8:34779 (RA;BR)
Montonen-Olive conjecture, 8:34771 (R;XA)
Saleh, A., *See* Sedlacek, G., 8:34219
Salesky, W.J., Medium carbon steel alloy design for wear applications, 8:33989 (J;NL)
Salisbury, K., *See* Sudarshan, T.S., 8:33638
Salm, S., *See* Teramura, A.H., 8:34659
Salmi, U., Fission source matrices in standard transport calculations, 8:33732 (RA;IL)
Salmon, R., PRP-4: an updated version of the discounted-cash-flow program PRP, 8:34964 (R;US)
Salome, J.M., Performance improvements of the Geel Linac neutron source, 8:34351 (J;US)
Sammells, A.F., *See* St. John, M.R., 8:34007
Sampson, T.E., *See* Li, T.K., 8:34055
Samuel, E.A., Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal, 8:33045 (RA;US)
Samuelsson, C., *See* Pettersson, H., 8:34416
Sanborn, R.H., *See* Crawford, R.W., 8:34149
Sannes, C.A. Jr., *See* Kaplan, S.M., 8:33048
Sano, Y., *See* Kitazawa, H., 8:34827
Sansone, P., Passive solar D.H.W. performance with lower costs in freezing climates, 8:33430 (J;US)
Santhanam, C.J., Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA;US)
Santo, C.M.E., Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon, 8:34687 (R;BR;In several languages)
Santor, S.D., *See* Lesuer, D.R., 8:34214
Santry, D.C., $^{127}I(n,2n)^{126}I$ reaction as a fast neutron flux monitor, 8:34380 (J;US)
Saphier, D., Dynamic modeling of an HTGR pebble bed reactor, 8:33683 (RA;IL)
Effect of asymmetric phenomena on core burn-up and power distribution, 8:33673 (RA;IL)
See Sharon, A., 8:33684
Saras, A.E., Passive solar residential Class C monitoring program in the Northeast Region, 8:33416 (J;US)
Sarda, J.P., *See* Gadelle, C., 8:32970
Sargent, G.A., Slurry erosion of materials, 8:33003 (BA;US)
Sargent, T. III, New blood flow radiopharmaceutical, 8:34545 (RA;US)
Saricks, C.L., *See* Johnson, L.R., 8:33924
Sasaki, M., *See* Kikuchi, Y., 8:33691
Sasamoto, S., *See* Kuwahara, H., 8:33645
Sathjanarayna, K., *See* Jones, M.S. Jr., 8:33374
Sauer, K.L., *See* Birnbreier, H., 8:33888
Saunders, W.M., *See* Castro, J.R., 8:34548
See Chatterjee, A., 8:34551
Saunderson, J.C., *See* Allibone, T.E., 8:33634, 8:34034
Sauter, A., Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface, 8:33765 (R;US)
Saville, D.A., Flow and thermal effects in continuous flow electrophoresis, 8:34237 (R;US)
See Russel, W.B., 8:32948
Sayre, J.A., Silicone encapsulant development for fireset applications, 8:34017 (R;US)

Schach, H., *See* Schach, V., 8:33930
Schach, V., Stress reduction at the production of bottle-cap screws, 8:33930 (R;DE;In German)
Schaefer, W., *See* Hamer, E., 8:33319
Schafer, R., *See* Gilbert, W., 8:34319
Schelling, F.J., *See* Castleman, A.W. Jr., 8:34121
Schenley, R.L., *See* Hsie, A.W., 8:34615
Schepkin, Yu.G., *See* Muradyan, G.V., 8:34837
Scherer, J.S., *See* Chatterjee, A., 8:34551
Scherzer, R., *See* Mielke, E.W., 8:34768
Schiferl, D., Structure of O_2 at 5.5 GPa and 299 K, 8:34051 (J;DK)
See Cromer, D.T., 8:34141
Schild, D., *See* Mortimer, R.K., 8:34502, 8:34503
Schillaci, M.E., Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R;US)
Schiller, S.R., *See* Martin, M., 8:33526
Schilling, E., *See* Meyer, W., 8:34304
Schilling, R., *See* Ruediger, A., 8:34882
Schimmerling, W., Inclusive neutron production by energetic heavy ions, 8:34194 (RA;US)
Physical characterization of energetic heavy-ion beams, 8:34313 (RA;US)
See Frankel, K.A., 8:34751
See Wong, M., 8:34752
Schlemmer, F., Qualification of the fuel technology for the plutonium recycling in light water reactors, 8:33667 (R;DE;In German)
See Manzel, R., 8:33727
Schlenker, R.A., *See* Keane, A.T., 8:34585
Schlesinger, T., *See* Eisen, Y., 8:34357
See Faermann, S., 8:34359, 8:34360, 8:34362
Schlinger, W.G., *See* Tassoney, J.P., 8:33010
Schlosser, G., Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R;DE;In German)
See Porsch, D., 8:33666
Schmaeler, M., *See* Hankes, L.V., 8:34511
Schmeling, P., *See* Dahlgren, T., 8:33937
Schmelzinger, W.L., *See* Richardson, J.H., 8:34192, 8:34193
Schmidt, K., *See* Lee, P.C., 8:34199
Schmidt, M., *See* Leipuner, L.B., 8:34322
Schmidt, W.F., *See* Aschwanden, T., 8:34699
Schmidt Pedersen, K., Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R;NO)
See Jakobsen, J.I., 8:33145
Schmittdiel, P.M., Groundwater quality in underground coal gasification: a regulatory outlook, 8:33068 (RA;US)
Schmitz, K., Analysis and evaluation of energy forecasting for the Federal Republic of Germany. Vol. 2, 8:33827 (R;DE;In German)
Schmitz, P., Construction of helium-heated steam reformers for high-temperature-reactors, 8:33686 (R;DE;In German)
Schneider, D., Electron spectroscopy with fast heavy ions, 8:34711 (RA;US)
Schneider, H.K., Interdependence between energy supply and the economy as a whole as an economic problem, 8:33851 (R;DE;In German)
Schneider, H.M., *See* Reed, C.W., 8:33648
Schneider, H.R., Improved field stability in RFQ structures with vane-coupling rings, 8:34286 (R;US)
Schneider, W., Improvement of the detection efficiency of Li-drifted Ge-detectors for \-radiation by irradiance with infrared-light of the wavelength 1.520μm to 1.795μm, 8:34520 (R;DE;In German)
Schnupp, L., *See* Ruediger, A., 8:34882
Schobert, H.H., Relationship of coal science to coal technology, 8:33015 (R;US)
Schoenau, G.J., Energy conservation measures for quonset type greenhouses in cold climates, 8:33523 (J;US)
Reducing edge losses in multilayer curtain type window shutters, 8:33906 (J;US)
Schoerner, W., Scintigraphic evaluation of the sacroiliac joints in anklylosing spondylitis, 8:34523 (R;DE;In German)
Schosser, R., Perfusion measurements with radioactively labelled microspheres. Technique and computer-based evaluation, 8:34527 (R;DE;In German)
Schrack, R.A., *See* Bowman, C.D., 8:34836
Schrader, C.A., Rammed earth construction: a re-emerging technology, 8:33917 (J;US)
Schroeder, B., *See* Hamer, E., 8:33319
Schroer, B., Topological aspects in field theory and confinement, 8:34780 (RA;BR)
Schroth, A., Radar meteorology in cloud physics and radio wave propagation research, 8:34394 (R;DE;In German)
Schuck, L., Vanpooling for profit: a business opportunity, 8:33925 (R;US)
Schuetten, R., Studies for the layout and technical conception of a two-circuit HTR power plant of 600 MWsub(el) under public utilizer aspects, 8:34469 (R;DE;In German)
Schuetze, B., Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R;DE;In German)
Schug, W., Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R;DE;In German)
Schuhmacher, K.H., *See* Jacobi, C., 8:33617
Schuldt, M.A., *See* LaVigne, A.B., 8:33423
Schultz, J.A., Developmental design status of riser cable systems for OTEC pilot plants, 8:33371 (RA;US)
See Roblee, L.H.S., 8:33370
Schulze, E., Numerical simulation of echo phenomena in plasma, 8:34895 (R;DE;In German)
Schulze, H.A., *See* Rind, W., 8:33685
Schulze, R.E., *See* Rind, W., 8:33685
Schumacher, D.G., BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R;US)
Schuster, H.J., *See* Lindemann, H., 8:34965
Schutz, M.E., *See* Clark, L.L., 8:33188
Schwalbe, L.A., Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J;GB)
See Cromer, D.T., 8:34141
Schwartz, E., *See* Peterson, G., 8:33131
Schwartz, R.B., *See* Kellie, J.D., 8:34801
Schwarz, H.A., Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J;US)
Schwarzer, K., Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R;DE;In German)
Schwefel, H.P., *See* Hoepfinger, E., 8:33792
Scofield, S.H., Climatological sundial, 8:33469 (J;US)
Scott, J.E., Thin-film evaporation of coal liquids, 8:33067 (R;US)
See Richards, A.D., 8:33058
Scott, J.H., Computer program for borehole compensation of dual-detector density well logs, 8:34389 (R;US)
Seabaugh, P.W., *See* Zielinski, R.E., 8:32998
Sedlacek, G., Program for the ultimate static load of spatial steel frames, 8:34219 (R;DE;In German)
Seed, J., *See* Legator, M.S., 8:34640
Sega, M., *See* Klein-Szanto, A.J.P., 8:34566
Seger, G.H., *See* Mullaney, P.F., 8:34556
Segev, M., Tight-lattice resonance absorption by cylinderization of extended cells, 8:33719 (RA;IL)
Seidl, M., *See* Hamer, E., 8:34089
Seifried, C., Pre-surgical radiologic diagnostics of pancreas diseases, 8:34521 (R;DE;In German)
Seigneur, C., Dynamic sensitivity analysis of chemical reaction systems: a variational method, 8:34151 (J;GB)
Seki, Y., *See* Kikuchi, Y., 8:33691
Selan, J.C., Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R;US)
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R;US)
Selig, W., Microdetermination of aliphatic amines and polyamines with cupric ion: relationship between pK_1 and half-complexation potential, 8:34066 (J;US)
New adducts of 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX), 8:34392 (J;DE)
See Hassan, S.S.M., 8:34082
Selim, O., *See* Davies, A.J., 8:34029
Selkirk, J.K., Species variance in the metabolic activation of polycyclic hydrocarbons, 8:34642 (J;US)
Selph, F., Isochronous stacking-ring approach to the HTE, 8:34290 (R;US)
Seltzer, S., Nuclear magnetic resonance, paramagnetic ion induced relaxation method to differentiate between 1,3-

diketo and 1,3-keto-enol isomers, 8:34131 (J;US)
Seltzer, S.F., *See* Whinnery, W.N., 8:33239
Sen, B., *See* Sen, S.P., 8:33273
See Singh, S.K., 8:33272
Sen, S.P., Water gas shift reaction. I, 8:33273 (J;IN)
Senftle, F.E., Neutron induced radioactivity for mineral exploration, 8:34390 (J;US)
Sengupta, P.K., Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J;US)
Sennerby, L., Wood properties of salix caprea and salix pentandra, 8:33334 (R;SE;In Swedish)
Senouci, B., *See* Berger, G., 8:34028
Senseny, P.E., *See* Pfeifle, T.W., 8:34670
Senterfit, R.M., Audio-magnetotelluric data log and station location map for the Glamis Known Geothermal Resource Area, California, 8:33558 (R;US)
Audio-magnetotelluric data log and station location map for the Saline Valley Known Geothermal Resource Area, California, 8:33559 (R;US)
Seppanen, O., Windows as cost effective solar collectors, 8:33501 (J;US)
Setlow, R.B., UV action spectra for mammalian systems: their implications for the predicted effects of ozone depletion of skin cancer incidence, 8:34576 (RA;DE)
Severson, D.E., *See* Wiltsee, G.A., 8:32941
Sewell, G.W., *See* Grula, M.M., 8:33120
Shabtai, J., *See* Muralidhar, G., 8:33139
Shafroth, S.M., High efficiency electron spectrometer for atomic collision physics research, 8:34354 (RA;US)
Shafton, A.L., Toolpack Fio library installers' guide, 8:34955 (R;US)
Shah, N.D., *See* Muzio, L.J., 8:33047
Shamai, Y., Facility for calibration of protection-level radiation instruments, 8:34363 (RA;IL)
See Eisen, Y., 8:34357, 8:34358, 8:34361
Shani, G., *See* Tsechanski, A., 8:34356
Shannon, J.D., Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur, 8:34410 (BA;US)
Sharapov, E.I., *See* Alfimenkov, V.P., 8:34798
Sharma, M.M., *See* Jang, L.K., 8:33110
Sharon, A., Simplified moving boundaries HTGR steam generator model for the DSNP simulation language, 8:33684 (RA;IL)
Shaw, B.R., *See* Rill, R.L., 8:34501
Shcherbakov, Yu.A., *See* Mikhajlov, M.N., 8:34377
Shea, M., Passive solar in the city: 93 townhouses near Portland, Oregon, 8:33505 (J;US)
See Newcomb, C., 8:33447
Sheetman, R.M., Electronics engineer's design station, 8:34252 (J;US)
Shell, S.L., Relaxation of SO_2 emission limits for the PGDP steam plant, 8:34420 (RA;US)
See Conrad, M.C., 8:33151
Shelley, R., *See* Brusegan, A., 8:34815
Shembel, B.K., *See* Abramov, A.G., 8:34311
Sheng, S.J., *See* Nakayama, T., 8:34204
Shenhav, N., Passive neutron waste monitoring system, 8:34364 (RA;IL)
Shenoy, G.K., Conversion electron Moessbauer spectroscopy of europium-151 and thulium-169, 8:34832 (J;GB)
Shenton, L.R., *See* Bowman, K.O., 8:34978
Shepard, K.W., Superconducting accelerating structure for particle velocities from 0.12 to 0.23 c, 8:34264 (R;US)
Shepard, M., Low cost site built fiberglass water containers for thermal mass and small scale aquaculture, 8:33525 (J;US)
Shepherd, J.C., *See* Rasmuson, D.M., 8:33772
Shepherd, R.F., *See* Shipman, H. Jr., 8:33393
Sherman, G. Jr., US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R;US)
Sherwood, L., *See* Wilson, A., 8:33546
Shiba, M., *See* Klein-Szanto, A.J.P., 8:34637
Shibley, R.G., *See* Fisher, W.J., 8:33500
Shibuya, Y., *See* Nakanishi, K., 8:33637
Shikanov, A.E., *See* Bespalov, D.F., 8:34310
Shinpock, S.G., *See* Goodman, J.W., 8:34495
Shintani, M., Invariant systems under the space-time inversion. Existence of the two kinds of the invesions, 8:34884 (R;JP)
Shipman, H. Jr., Approach to risk assessment in OTEC development planning, 8:33393 (RA;US)
Shirley, D.A., *See* Southworth, S., 8:34181
Shiue, C.Y., *See* Crawford, E.J., 8:34508
Shiyuan, H., Hydration of fly ash cement and microstructure of fly ash cement pastes, 8:33017 (R;SE)
Shore, V., *See* Lindgren, F.T., 8:34057
Short, D.W., *See* Sutton, S.B., 8:33970
Shostak, V.B., *See* Pasechnik, M.V., 8:34537
Shourds, K., *See* McBride, J.R., 8:33522
Shulgin, A.T., *See* Sargent, T. III, 8:34545
Shuriet, G., *See* Adib, M., 8:34803
Siddagangappa, M.C., Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA;US)
Siebels, J., *See* Langer, M., 8:33947
Siebert, D., Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R;DE;In German)
Siegel, M.D., Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA;US)
See Pepping, R.E., 8:33253, 8:33255
Siegel, M.M., Assessment of underground coal gasification in bituminous coals, 8:32974 (RA;US)
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA;US)
See James, W.M., 8:32985
Siemens, D.H., Remote design features for the West Valley slurry-fed ceramic melter system, 8:33232 (R;US)
Sienkiewicz, C.J., *See* Finn, P.A., 8:34918
Sigel, R., *See* Foelsner, W., 8:34932
Sigmond, R.S., Mass spectrometry of low energy ions extracted from medium pressure air coronas, 8:34704 (RA;US)
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA;US)
Signorelli, R.A., High temperature composites. Status and future directions, 8:34010 (R;US)
Signorini, C., Progress report on the XTU-tandem of the laboratori Nazionali di Legnaro, 8:34326 (BA;US)
See Spolaore, P., 8:34333
Sikov, M.R., *See* Kelman, B.J., 8:34608, 8:34609
Silbar, R.R., *See* Vagradov, G.M., 8:34764
Silence, W.L., Selection and use of alloys for flue gas desulfurization systems, 8:33960 (RA;US)
Silker, W.B., Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R;US)
Sillman, S., *See* Bircher, T.L., 8:33410
Silver, J.M., Potential for an Australian uranium industry, 8:33817 (R;AU)
Siman-Tov, I., *See* Ball, S.J., 8:33760
Siminovitch, M.J., *See* Bergeson, D.E., 8:33449
Simpson, J.L., *See* Grant, R.J., 8:33027
Sims, W., *See* Leipuner, L.B., 8:34322
Sinclair, T.R., *See* Biggs, R.H., 8:34647
Singer, C.E., Axisymmetric scrape-off plasma transport, 8:34937 (R;US)
See Hwang, D.Q., 8:34903
Singer, J., Application of TL evaluation equipment in personnel dosimetry - type NHZ-203 imported from Hungary, 8:34369 (RA;CS;In Czech)
Singer, M.E., Microbial processes in the recovery of heavy petroleum, 8:33115 (RA;US)
Singh, J.J., Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R;US)
Singh, S.K., Water gas shift reaction. II, 8:33272 (J;IN)
Singleton, A.H., Industrial viewpoint of synthetic fuels, 8:32962 (RA;US)
See Davis, B.E., 8:32971
Sinha, S.K., Experimental studies of two dimensional melting, 8:34153 (BA;US)
Sink, D.A., First-wall-coating candidates for ICF reactor chambers using dry-wall protection only, 8:34913 (R;US)
Sinnock, S., Empirically determined uncertainty in potassium-argon ages for Plio-Pleistocene basalts from Crater Flat, Nye County, Nevada, 8:34669 (R;US)
Siomos, K., Laser two-photon ionization spectroscopy of molecules in liquids, 8:34191 (J;NL)
Laser-two-photon ionization of organic molecules in dielectric liquids, 8:34184 (J;NL)
See Kourouklis, G.A., 8:34150
Sirtl, E., Silicon material development for terrestrial solar cells, 8:34019 (R;DE;In German)
Sisson, W.B., Carbon metabolism of plants exposed to UV-B radiation, 8:34656 (RA;DE)
Sjoeen, K., *See* Fanneloep, T.K., 8:33154
Skaaret, E., Ventilation by stratification and displacement, 8:33895 (R;US)
Skaerbaeck, E., *See* Eriksson, S., 8:33336

Skeppstedt, M., Wave energy in the electric power system, 8:33584 (R;SE;In Swedish)
Skinner, G.B., *See* Pamidimukkala, K.M., 8:34087
Skinner, M.F., *See* Kaplan, S.M., 8:33048
Skiad, P.S., Quantification of energy loss measurements with the use of K and L absorption edges, 8:34075 (BA;US)
Skonberg, E.R., Horizontal drilling for underground coal gasification, 8:32968 (RA;US)
Skorka, S.J., Design considerations and present status of beam bunching technology, 8:34296 (BA;US)
Skrypnik, V.P., Calculation of low-frequency asymptotics for Green functions of degenerate Bose-systems (kinetic approximation), 8:34762 (RA;SU;In Russian)
Slack, C., *See* Krumpelt, M., 8:33882
Slaga, T.J., Strain differences and solvent effects in mouse skin carcinogenesis experiments using carcinogens, tumor initiators, and promoters, 8:34616 (R;US)
See Mamrack, M., 8:34645
Slocomb, C., *See* Buzbee, B., 8:34961
Slote, J., *See* Kelley, M., 8:33420
Slowikowski, J., *See* Lampe, J., 8:34039
Slutsky, A.S., *See* Lehnert, B.E., 8:34569
Small, G.J., *See* Johnson, C.K., 8:34152
Smeltzer, W.W., High temperature sulfidation properties of iron-chromium-base alloys, 8:33981 (BA;US)
Smith, A.B., *See* Thun, M.J., 8:34603
Smith, C.A., *See* Laub, R.J., 8:34086
Smith, C.F., *See* Alesso, H.P., 8:34847
Smith, D., *See* Hollinden, G., 8:33030
Smith, D.G., *See* Cooper, D.W., 8:33766
Smith, D.H., Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures, 8:34134 (J;GB)
Simple method to enhance thermal emission of metal ions, 8:34074 (J;NL)
Smith, D.L., *See* Abdou, M., 8:34921
See Misra, B., 8:34917
Smith, E.O., *See* Rhudy, R.G., 8:33034
Smith, F.G., Two-dimensional simulation of drainage flow and tracer gas transport in the Geysers area, 8:34397 (R;US)
Smith, G.P., *See* Petrovic, C., 8:34111
Smith, G.W., *See* James, H.R., 8:32973
See McCown, P.J., 8:32991
Smith, H.S., *See* Yang, T.C., 8:34592
Smith, L., *See* Bisognano, J., 8:34283
Smith, L.C., Radiation effects studies for the high-resolution spectrograph, 8:34246 (R;US)
Smith, P.D., Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R;US)
Smith, R.D., Capillary column supercritical fluid chromatography/mass spectrometry, 8:34064 (J;US)
See Nagarajan, V., 8:33091
Snover, K.A., Proton capture to excited states of ^{16}O; Ml, El and Gamow-Teller transitions and shell-model calculations, 8:34799 (R;US)
Snow, G.A., *See* Caswell, W.E., 8:34744
Snyder, J.E., *See* Yarden, A.L., 8:33381
Soares, H.V., *See* de Lima, J.M., 8:33704
Soden, J.E., Study of ocean cableships applied to submarine power cable installation, 8:34259 (RA;US)
Soederqvist, S., Preliminary estimation of the expected noise levels from the Swedish WECS prototypes Maglarp and Naesudden, 8:33591 (R;SE)
Soerman, L.O., *See* Bergendahl, L., 8:33579
Sohn, I., *See* Leontief, W., 8:33793
Soister, P., Colorado lignite for underground coal gasification, 8:32983 (RA;US)
Sokolowski, J.S., *See* Ben-Zvi, I., 8:34331
Solety, P., *See* Gadelle, C., 8:32970
Solito, J., *See* da Silveira, P.R.N., 8:33820
Somerville, I.C., Statistical time-lag to spark breakdown in high pressure SF_6, 8:34031 (RA;US)
Somorjai, G.A., *See* Leygraf, C., 8:33260
Sondreal, E.A., *See* Wiltsee, G.A., 8:32941
Sonnichsen, T.W., *See* Muzio, L.J., 8:33047
Sonntag, C., *See* Ledent, P., 8:32975
Sontheimer, F., *See* Manzel, R., 8:33727
Soracco, R.J., *See* Fliermans, C.B., 8:34561
Sorell, G., *See* Lendvai-Lintner, E., 8:33001
Sorlie, M., *See* Petrovic, C., 8:34111
Sotelo, J., *See* Wormley, D.N., 8:33396
Sotnikov, V.V., Statistically optimal evaluation of decay constant using the data of measurements with low background noise, 8:34539 (RA;SU;In Russian)
Southworth, S., Photoelectron angular distributions from H_2 and D_2, 8:34181 (J;NL)
Spallucci, E., *See* Denardo, G., 8:34773
Spears, J.W., Performance analysis methodology for passive heating systems in the NSDN, 8:33415 (J;US)
Speck, J., *See* Hauschild, W., 8:33644
Spellicy, E., *See* Redebaugh, R., 8:33998
Spellmeyer, B., VICKSI-operating experience and future plans, 8:34335 (BA;US)
Spencer, D.K., *See* Sargent, G.A., 8:33003
Spencer, F.E. Jr., Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R;US)
Spencer, R.B., *See* Mencher, F.M., 8:33379
Spendel, T., *See* Prenger, F.C., 8:34231
Spengler, C.J., Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA;US)
Sperlich, V., *See* Biasin, K., 8:33409
Spicer, L.D., Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J;US)
Spiller, J.R., *See* Soden, J.E., 8:34259
Spingarn, J.R., *See* Hughes, D.A., 8:33365
Spolaore, P., First operation of the XTU-tandem 150 kv injector, 8:34333 (BA;US)
Sponholz, H.J., *See* Jacobi, C., 8:33617
Spriggs, D.R., Effect of PFBC particulate on the high velocity erosion-corrosion of gas turbine materials, 8:33007 (BA;US)
Springham, D.G., Some constraints on the use of bacteria in enhanced oil recovery, 8:33125 (RA;US)
See Moses, V., 8:33124
Spurk, J.H., *See* Keiper, R., 8:33264
Spurny, F., Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA;CS;In Czech)
Experience with work with double ionization chambers, 8:34371 (RA;CS;In Czech)
Response of some detectors to thermal neutrons, 8:34370 (RA;CS;In Czech)
See Charvat, J., 8:34366
See Turek, K., 8:34373
Srapenyants, R.A., *See* Stolyarova, E.L., 8:34540
Srbek, J., Cost-benefit analysis of application of H_3BO_3 thermal regeneration in WWER type reactors, 8:33678 (RA;CS;In Czech)
Srivastava, K.D., *See* Anis, H., 8:33642
Srubar, R.L., *See* Vliet, G.C., 8:33412
St. John, M.R., Characterization of an iron boride coating produced by pack boronization of low carbon steel, 8:34007 (J;GB)
Staaf, H., Distribution of organic matter, carbon and plant nutrients in soil in the early phase after clearcutting of a scots pine forest; with and without removal of logging slash, 8:33345 (R;SE)
Staehler, J., Development of a low-pressure proportional chamber for particle detection in ion-X-ray-coincidence experiments and a study of inner shell differential ionisation probabilities, 8:34519 (R;DE;In German)
Stafford, R.S., *See* Legator, M.S., 8:34640
Stafford, R.W., Technical problems of WECS interconnection, 8:33600 (RA;DE)
Stakebake, J.L., Determination of plutonium dioxide surface areas from x-ray crystallite sizes, 8:33182 (J;US)
Staker, G., *See* Connolly, M.S., 8:34161
Stambeck, A., *See* Noren, O., 8:33328
Stampfer, J.F., Development of sampling and analytical method for styrene oxide, 8:34068 (J;US)
See Morales, R., 8:34409
Stampfer, M.R., In vitro transformation of human mammary epithelial cells, 8:34621 (RA;US)
Properties of human mammary epithelial cells in culture, 8:34497 (RA;US)
See Bartley, J.C., 8:34622
See Yang, T.C., 8:34592
Stanaland, V.A., Computer programs for calculating thermal distribution on uranium-6 weight percent niobium alloy during electron-beam welding, 8:33974 (R;US)
Stangert, P., Alternative motor fuels. A survey of the government R and D efforts, 8:33952 (R;SE;In Swedish)
Staples, J., Beam dynamics and vane geometry in the LBL Heavy-Ion RFQ, 8:34287 (R;US)
Staudt, A., Model to calculate the temperature characteristics of heat storage basins, 8:33781 (R;DE;In German)
Stclair, T.L., *See* Singh, J.J., 8:34016
Steele, W.V., Standard enthalpy of formation of peroxymonosulfate (HSO_5^-) and the standard electrode

potential of the peroxymonosulfate-bisulfate couple, 8:33277 (J;GB)
Stehney, A.F., *See* Keane, A.T., 8:34585
Stein, P.J., *See* Bitensky, M.W., 8:34487
Steinberg, M., Flash pyrolysis of coal with reactive and non-reactive gases. Progress report, October 1, 1981-September 30, 1982, 8:32946 (R;US)
Steindler, M.J., Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R;US)
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R;US)
Steiner, R., *See* Lihach, N., 8:33661
Steinert, L., *See* Matthes, H., 8:34348
Steinlin, H.S., *See* Hakkila, P., 8:33876
Steinmueller, D., Some effects of enhanced UV-B radiation on surface lipids of Cucumis sativus cotyledons, 8:34581 (RA;DE)
Stencel, J.R., Environmental monitoring report for calendar year 1982, 8:34935 (R;US)
Stepanov, A.V., *See* Malyshev, I.F., 8:34267
Stepanov, Eh.K., *See* Danilenko, V.N., 8:34473
Stephanopoulos, G., *See* Seigneur, C., 8:34151
Stephansson, O., Small houses in rocks. Preliminary study, 8:33896 (R;SE;In Swedish)
Stevens, A., Yeast endoribonuclease stimulated by Novikoff Hepatoma small nuclear RNAS U1 and U2, 8:34486 (J;US)
Stevens, D.G., Carpeted slab floors and comfort in direct gain systems, 8:33440 (J;US)
Design days for passive solar, 8:33472 (J;US)
Stevens, F.J., *See* Boernke, W.E., 8:34147
Stevenson, M.G, Nuclear reactor safety. Progress report, July 1-October 31, 1982, 8:33759 (R;US)
Stewart, A.J., Asymmetrical relationships between absorbance, fluorescence, and dissolved organic carbon, 8:34448 (J;US)
Dissolved humic materials: photodegradation, sediment effects, and reactivity with phosphate and calcium carbonate precipitation, 8:34446 (J;DE)
Phytoplankton contribution to alkaline phosphatase activity, 8:34442 (J;DE)
See Beer, S., 8:34491
Stewart, D.A., FGD chemistry and water integration, 8:33033 (RA;US)
Stewart, G.H., *See* Dowell, F., 8:34069
Stewart, J.H. Jr., *See* Dunn, H.W., 8:34072
Stewart, J.R., *See* Douglass, D.A., 8:33658
Stewart, R.C., *See* James, W.M., 8:32985
See Siegel, M.M., 8:32974
Stickney, B.L., Comparative performance indices for solar batch water heaters, 8:33433 (J;US)
Stiglich, J.J., Coatings for elevated temperature wear resistance, 8:34002 (BA;US)
Stinton, D.P., Characterization of hydrofracture grouts for radionuclide migration, 8:33196 (R;US)
Stocks, G.M., *See* Szotek, Z., 8:33956
Stoeber, S., Aerosols in science, medicine, and technology. Aerosols in and from industrial processes, 8:33184 (R;DE;GE)
Stoecker, H.M., Fundamental examinations for the mechanisation of the support work in headings by blasting and by using selective cut heading machines, 8:34258 (R;DE;In German)
Stokstad, R.G., Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R;US)
Stolyarova, E.L., Comparison of some computerized methods for gamma spectra interpretation, 8:34540 (RA;SU;In Russian)
Stone, G.C., *See* Boggs, S.A., 8:33641
Stone, J.A., Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R;US)
Storr, K.M., *See* Carroll, J.T., 8:34321
Stow, S.H., Waste isolation program, 8:33227 (RA;US)
Stowe, D.H., *See* Henzel, D.S., 8:33053
Strain, J.E., *See* Bauer, M.L., 8:33185
Strathdee, J., *See* Salam, A., 8:34771
Straub, D., Conservation and passive solar: a performance comparison in Washington State, 8:33444 (J;US)
See Palmiter, L., 8:33458
Straus, D.A., Preparation and reaction of metal ketene complexes of Zr and Ti, 8:34096 (J;US)
Strauss, H.R., *See* Izzo, R., 8:34907
Streets, D.G., *See* Garvey, D.B., 8:33800
Streit, L.P., *See* Moe, R.J., 8:33902
Streit, R.D., Analysis of circumferential cracking in hydroformed bellows, 8:34215 (R;US)
Streitwieser, A. Jr., *See* Zalkin, A., 8:34207
Stringer, J., *See* Minchener, A.J., 8:33095
Strniste, G.F., *See* MacInnes, M.A., 8:34494
Stroem, B., Formation and reduction of NO sub (x) and POM in coal firing, 8:33057 (R;SE;In Swedish)
Strohbach, P., *See* Ambrosius, G., 8:33663
Strohschein, H., *See* Poettken, H.G., 8:33931, 8:33932
Strong, S.J., Photovoltaics and passive: the house of the future, 8:33363 (J;US)
Struve, K.W., *See* Prono, D.S., 8:34294
Studhalter, W.R., Development of the biphase turbine for waste-heat conservation. Final report, 8:33934 (R;US)
Stuermer, D.H., *See* Wang, F.T., 8:33070
Stuetzle, W., *See* Friedman, J.H., 8:34972
Stumer, I., *See* Aronson, S., 8:34747
Stutzki, C., *See* Sedlacek, G., 8:34219
Subramanian, R.S., The migration of fluid droplets and their interactions in a thermal gradient, 8:34741 (R;US)
Subramanian, T.S., *See* Schimmerling, W., 8:34313
Sucov, E.W., Fluidized-bed design for ICF reactor blankets using solid-lithium compounds, 8:34914 (R;US)
Sudarshan, T.S., Electrostatic field evaluation by the electrolytic tank method, 8:33638 (RA;US)
Suenaga, M., Metallurgy of continuous filamentary A15 superconductors, 8:34012 (BA;US)
Suganomata, S., *See* Matsuzawa, H., 8:34706
Sugimitsu, T., *See* Isoya, A., 8:34275
Sugiura, Toshio, Negative ion formation and neutralization processes, (1). Related to plasma heating by 'negative ion based neutral beam injection', 8:34899 (R;JP;In Japanese)
Sugiyama, H., *See* Harumoto, Y., 8:33647
Sugiyama, K., Status of gamma ray production cross section data, 8:34858 (J;US)
See Hino, Y., 8:34810
Sula, M.J., Atmospheric monitoring, 8:34418 (RA;US)
Columbia River water quality monitoring, 8:34456 (RA;US)
Columbia River radiological monitoring, 8:34458 (RA;US)
Environmental surveillance at Hanford for CY 1982, 8:34435 (R;US)
Foodstuffs, 8:34427 (RA;US)
Ground water, 8:34459 (RA;US)
Penetrating radiation, 8:34430 (RA;US)
Radiological impact of Hanford operations, 8:34431 (RA;US)
Soil and vegetation, 8:34429 (RA;US)
Wildlife, 8:34428 (RA;US)
Sullivan, J.C., *See* Nash, K.L., 8:34042
Sullivan, R.F., Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Task 10. Hydrotreating of EDS and H-Coal blends for biological studies. Seventh interim report, 8:32947 (R;US)
Sulygin, I.I., *See* Abramov, A.G., 8:34311
Sun, Y.C., A model analysis of separation initiated external combustion in supersonic flow over a flat plate, 8:34232 (R;US)
Sun Hong-zhon, Irreducible representations of the simple Lie groups II - the tensor basis for the infinitesimal generators of the exceptional groups, 8:34889 (R;XA)
Sundaram, M.S., *See* Steinberg, M., 8:32946
Sundberg, J., Methods for the determination of thermal properties of soils and rocks, 8:33568 (R;SE;In Swedish)
Sundstedt, E., *See* Mattson, J.E., 8:33344
Suong, J.Y., Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J;CH)
Susak, N., *See* Nash, K.L., 8:34042
Suter, M., *See* Balzer, R., 8:34347
Sutin, N., *See* Bergkamp, M.A., 8:34183
See Creutz, C., 8:34177
Sutton, S.B., Model for the growth of a two-phase corrosion scale, 8:33970 (R;US)
Suwito, S., Study of cerebral metastases by means of computerized tomography, 8:34535 (R;DE;In German)
Svensson, J., Wave data from Swedish coastal waters 1979-80, 8:33580 (R;SE;In Swedish)
Svensson, J.E., Knowledge about energy. An inventory of Swedish energy systems studies and some hypothesis of research needs, 8:33806 (R;SE;In Swedish)
Svin'in, M.P., *See* Akulov, V.V., 8:34265
Swansiger, R.W., *See* Bissell, E.R., 8:34166
Swanson, B.I., *See* Jones, L.H., 8:34099
Swartz, C.K., *See* Weinberg, I., 8:33330
Swedman, A.S., *See* Hoegstroem, U., 8:33062

Swenson, D.V., A probabilistic analysis of LWR steam explosions, 8:33771 (BA;US)
Switendick, A.C., Electronic energy band structure of UH_3, 8:34000 (J;CH)
Szabo, G., *See* Kiss, A., 8:34276
Szotek, Z., Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R;US)

T

Tabakoff, W., Erosion behavior of materials in multiphase flows, 8:33980 (BA;US)
Tackaberry, R., *See* Lihach, N., 8:33661
Tadikamalla, P.R., Complete guide to gamma variate generation, 8:34971 (J;US)
Tadros, F., *See* Hassan, S.S.M., 8:34082
Tahir Shah, K., Breakdown of predictability: an investigation on the nature of singularities, 8:34888 (R;XA)
Tait, N.R.S., Physical properties and structure of carbon foils made by the dc glow discharge process, 8:34337 (BA;US)
Takeda, M., *See* Fukuda, T., 8:34784, 8:34785
Takemori, H.T., *See* Barlett, R.H., 8:34950
Takuma, T., *See* Fujinami, H., 8:33646
Takusagawa, F., *See* Fumagalli, A., 8:34135
Tal, A., *See* Eisen, Y., 8:34361
See Faermann, S., 8:34359
Talla, V., *See* Srbek, J., 8:33678
Tam, T.M., *See* Connick, R.E., 8:34104
Tamhankar, S.S., Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R;US)
See Wen, C.Y., 8:32951
Tamura, M., *See* Lucas, J.C.R., 8:33746
Tamura, T., Earth sciences, 8:34677 (RA;US)
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R;US)
Tan, E.L., *See* Brimer, P.A., 8:34639
Tanabe, T., *See* Kuwahara, H., 8:33645
Tanaka, M., *See* Aronson, S., 8:34747
Tandberg-Hanssen, E.A., *See* Dabbs, J.R., 8:34689
Tandy, P.C., *See* Schimmerling, W., 8:34194
Tang, C., *See* Nandi, R.K., 8:34094
Tannenbaum, M.J., Fast asynchronous level 1 pre-trigger for electrons at L = $10^{33} cm^{-2} sec^{-1}$, 8:34300 (R;US)
Tapanainen, J., Drying of peat and wood biomass. Literature review, 8:33357 (R;FI;In Finnish)
Tarczon, J.C., *See* Miyano, K., 8:34154
Tassoney, J.P., Multihydrotorting of coal, 8:33010 (P;US)
Tavlarides, L.L., Modelling and scaleup of dispersed phase liquid-liquid reactors, 8:34160 (J;GB)
Taylor, C., Conceptual magnet design for an iron-free colliding beam accelerator, 8:34289 (R;US)
See Gilbert, W., 8:34319
Taylor, F.G. Jr., *See* Parr, P.D., 8:34614
Taylor, P.A., Reclamation and disposal of water-based machining coolants, 8:34451 (RA;US)
Taylor, R.D., Denver Metro Solar House: incremental costs and payback analysis, 8:33297 (J;US)
Tedford, D.J., *See* Somerville, I.C., 8:34031
Temmerman, W.M., *See* Szotek, Z., 8:33956
Temple P.L., *See* Fanning, M.W., 8:33466
Templeton, D.H., *See* Zalkin, A., 8:34207
Templeton, W.L., Ocean disposal of radioactive wastes, 8:33236 (J;US)
Tenforde, T.S., Biological effects of magnetic fields, 8:34664 (RA;US)
Tennant, R.W., Endogenous retrovirus and radiation-induced leukemia in the RMF mouse, 8:34572 (R;US)
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J;US)
Radiation-induced leukemogenesis in RFM/UN strain mice: a potential model for retrovirus sequence transposition, 8:34606 (BA;US)
Tenney, F.H., Pulse pile-up effects, 8:34906 (R;US)
Tenore, K.R., *See* Hanson, R.B., 8:34509
Teoh, H., Electrical conductivity of doped polyacrylonitrile (PAN), 8:34013 (R;US)
Tepel, J.W., Improved formulas for compound nucleus cross sections, 8:34849 (J;US)
Teramura, A.H., Effects of UV-B irradiation on leaf resistances in two crop species during mild water stress, 8:34659 (RA;DE)
UV-B irradiation effects on soybean photosynthetic recovery from water stress, 8:34660 (RA;DE)
See Tevini, M., 8:34658
Terasaka, K., *See* Ishikawa, M., 8:34033
Terhoeven, P., Subtoxic lead exposure of the albino rat during different phases of development and its effects on the open-field behaviour and the learning ability as studied by discrimination tests, 8:34624 (R;DE;In German)
Terhorst, W., *See* Schmitz, K., 8:33827
Ternoey, S.E., *See* Kurkowski, T.L., 8:33503
Ternot, A., *See* Gadelle, C., 8:32970
Terzaghi, M., *See* Klein-Szanto, A.J.P., 8:34637
Tetzlaff, G., *See* Coppin, P.A.W., 8:33585
Tevini, M., Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA;DE)
Effects of UV B radiation on composition of two crop species during mild water stress, 8:34658 (RA;DE)
See Caldwell, M.M., 8:34575
See Iwanzik, W., 8:34583
See Steinmueller, D., 8:34581
See Teramura, A.H., 8:34659
See Thoma, U., 8:34649
Than, K., Testing of heat exchanger systems for reheating flue gases from wet scrubbing desulfurization plants, 8:32943 (R;DE;In German)
Tharwat-El-Mohandes, M., *See* Abdel-Salam, M., 8:34735
Thayer, D.R., *See* Hodson, E.K., 8:34973
Thedeen, T., *See* Gerholm, T.R., 8:33794
Thelen, J., *See* Schwarzer, K., 8:34426
Thiagarajan, V., *See* Jones, M.S. Jr., 8:33374
Thieberger, P., Recent upgrading of the Brookhaven double MP facility and plans for the future, 8:34303 (R;US)
Thien, K.D., Investigation on the stress of miners by dry and hot climatic conditions, 8:34610 (R;DE;In German)
Thoernqvist, T., Importance of cover and air under-base with storage of fuel chip chips, 8:33347 (R;SE;In Swedish)
See Nylinder, M., 8:33340
Thoernqvist, Th., Drying of fuel chips with solar panel warmed air, 8:33346 (R;SE;In Swedish)
Thoma, U., Effect of enhanced UV-B radiation on leaf surface and anatomy, 8:34649 (RA;DE)
See Tevini, M., 8:34648
Thomas, G., *See* DenHartog, P., 8:34339
See Salesky, W.J., 8:33989
Thomas, J.R., *See* Corbett, B.L., 8:33734
Thompson, B.G., *See* Jack, T.R., 8:33114
Thompson, J.E., *See* Sudarshan, T.S., 8:33638
Thompson, L.H., *See* MacInnes, M.A., 8:34494
Thomson, W.J., Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R;US)
Thor, S.E., *See* Eggwertz, S., 8:33607
See Johnson, I., 8:33606
See Lundemo, C., 8:33604
Thornton, R.K., Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J;US)
Thorsness, C.B., *See* Hill, R.W., 8:32996
Thorstenson, J., Passive solar commercial building in Minnesota, 8:33537 (J;US)
Thresher, R.W., Response of the Mod-OA wind-turbine rotor to turbulent atmospheric wind, 8:33592 (R;US)
Thrift, R., Use of low density lipoprotein (LDL) colloidal gold complexes to study the distribution of low density lipoproteins on cell surfaces, 8:34481 (RA;US)
Thuma, B., *See* Hoffman, S., 8:33219
Thun, M.J., Health Hazards Evaluation Report No. HETA-81-055-954, Cotter Corporation, Canon City, Colorado, 8:34603 (R;US)
Thun, R., *See* Ekman, E., 8:33080
Thune, H.W., *See* Jones, V.T., 8:32979
Tielert, R., *See* Wieder, A., 8:34244
Tiernan, M., *See* Warren, N., 8:33555, 8:33573
Tietjen, J., *See* Hanson, R.B., 8:34509
Tilenschi, I., *See* Milosevic, I., 8:34245
Tincknell, B.P., *See* Goth-Goldstein, R., 8:34619
Ting, A., *See* Yamazaki, A., 8:34488
Tinoco, I. Jr., *See* Maestre, M.F., 8:34056
Tischer, R.E., *See* Vaishnava, P.P., 8:34095
Tishin, V.G., *See* Alfimenkov, V.P., 8:34798
Tobey, R.A., Zinc-induced resistance to alkylating agents: lack of correlation between cell survival and metallothionein content, 8:34641 (J;US)

Tobias, C.A., Cellular and molecular radiobiology of heavy-ion beams, 8:34594 (RA;US)
See Fabrikant, J.I., 8:34550
See Yang, T.C., 8:34593
Tobochnik, J., Properties of two-dimensional polymers, 8:34018 (J;US)
Todo, A.S., Calculated initial energies of electrons in Si and SiO_2 irradiated by photons with energies up to 2 MeV, 8:34855 (J;NL)
Todorov, T.S., Commutativity of charge superselection rules in standard quantum field theory, 8:34772 (R;XA)
Tokushige, H., Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R;US)
Tolfree, D., *See* DenHartog, P., 8:34339
Tollaksen, S.L., Use of carbamylated charge standards for testing batches of ampholytes used in two-dimensional elecrophoresis, 8:34175 (J;DE)
Tolliver, J.S., *See* Hastings, D.E., 8:34901
Toman, J., Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA;CS;In Czech)
Tomasek, M., Indicator of air contamination with radioactive iodine isotopes, 8:33259 (RA;CS;In Czech)
Tombazis, A., *See* Loftness, V., 8:33476, 8:33512
Tomimatsu, A., *See* Azuma, T., 8:34786
See Kihara, M., 8:34883
Tomita, M., *See* Yoshizawa, Y., 8:34211
Tong, Y.T., Comments on the Carrara-Thione breakdown model of long air gap during positive switching surges, 8:33632 (RA;US)
Toohey, R.E., *See* Rundo, J., 8:34412
Toppel, B.J., User's guide for the REBUS-3 fuel cycle analysis capability, 8:33701 (R;US)
Torronen, K., *See* Cullen, W.H., 8:33680
Torsethaugen, K., Meeting on wave data for wave energy, 8:33581 (R;SE;In Norwegian and English)
Toshkov, S., *See* Bakalov, T., 8:34839
Toth, C., US plans for the United Nations conference on new and renewable sources of energy, 8:33872 (RA;US)
Toth, L.E., *See* Huang, T.T., 8:33005
Trabalka, J.R., *See* Reichle, D.E., 8:34401
Trachsel, C., *See* Abdou, M., 8:34921
Trejbal, Z., *See* Bejshovets, V., 8:34268
Trexler, E.C., DOE's electron beam irradiation development program, 8:33036 (RA;US)
Trifonov, A.I., *See* Mikhajlov, M.N., 8:34377
Trimble, L., *See* Burwell, D., 8:33388
Trinajstic, N., *See* Randic, M., 8:34164
Trinh, N.G., *See* Vincent, C., 8:34027
Troshev, T.M., *See* Mikhajlov, M.N., 8:34377
Truemper, J., Role of cyclotron resonance processes in the spectra of accreting neutron stars, 8:34683 (R;DE)
Truesdale, C.M., *See* Southworth, S., 8:34181
Truhan, J.J., Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R;US)
See Sutton, S.B., 8:33970
Trussell, H.J., *See* Schwalbe, L.A., 8:33994
Tsallis, C., Majority rule model: real space renormalition group solution and finite size scaling, 8:34862 (R;BR)
Random magnetism, 8:34877 (RA;BR)
Tsechanski, A., Possibility of p,chemical bond discrimination in a NE213 liquid scintillator, 8:34356 (RA;IL)
Tseng, J.C., *See* Crawford, T.V., 8:34440
Tserruya, I., *See* Stokstad, R.G., 8:34808
Tsolas, N., *See* Abed, E., 8:33652, 8:33657
Tsongas, G.A., New quick-and-easy performance prediction method, 8:33457 (J;US)
See McDonald, C.L., 8:33445
Tsotsis, T.T., Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R;US)
Tsybin, A.S., *See* Bespalov, D.F., 8:34310
Tuli, J.K., Evaluated nuclear structure data file. A manual for preparation of data sets, 8:34790 (R;US)
Thermal neutron capture gamma-rays, 8:34789 (R;US)
Tung, S.E., *See* Louis, J.F., 8:33086
Turc, L., *See* Meriaux, S., 8:33308
Turek, K., Other possibilities of applying solid state track detectors in neutron dosimetry, 8:34373 (RA;CS;In Czech)
See Spurny, F., 8:34370
Turner, G.E., Data acquisition and control for LMFBR component testing, 8:33688 (R;US)
See Phillips, T.R., 8:33270
Turner, J.E., *See* Todo, A.S., 8:34855
Turner, L.R., Electromagnetic effects on the FED/INTOR limiter, 8:34920 (R;US)
Turtiainen, H., Leak location in district heating networks using acoustical correlation techniques, 8:33943 (R;FI;In Finnish)
Tuthill, E.J., *See* Hill, D., 8:33235

U

Ubbelohde, M.S., Approach to teaching calculation procedures for passive design, 8:33483 (J;US)
Uehara, H., Test of OTEC plant in Imari Bay, 8:33392 (RA;US)
Uherka, D.J., *See* Heames, T.J., 8:34262
Ukraintsev, V.F., *See* Bakalov, T., 8:34839
Ulrich, A., Heavy ion beam pumped He-Ar, He-Xe, and Ar-Xe gas lasers, 8:34228 (RA;US)
Ulrich, M., *See* Andelfinger, C., 8:34927
Umans, S.D., *See* Wormley, D.N., 8:33396
Unosson, L., *See* Granelli, W., 8:33337
Updegraff, D.M., Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA;US)
Upschulte, B., *See* Castleman, A.W. Jr., 8:34121
Urban, W.T., *See* Clark, B.A., 8:34854
Urbanic, V.F., *See* Cheadle, B.A., 8:33987
Uteberg, E., Insect damage to fast growing Salix and Populus species, 8:33333 (R;SE;In Swedish)
Uyttendaele, P., *See* Porsch, D., 8:33666
See Schlosser, G., 8:33703

V

Vager, Z., *See* Faibis, A., 8:34344
Vaglieri, V., *See* Fanchiotti, A., 8:33438
Vagradov, G.M., Inelastic scattering pions on nuclei with excitation of particle-hole states, 8:34764 (J;SU;In Russian)
Vaishnava, P.P., Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J;US)
Vaitl, D., X-ray cineradiography with particular and non-particular contrast-media. A comparative study for theory and praxis, 8:34526 (R;DE;In German)
Valkonen, E., Solar absorbing properties of thermally oxidized stainless steel, 8:33542 (R;SE;In Swedish)
Vallejo, Y., Coal-liquid mixtures. A technical study, 8:33084 (R;SE;In Swedish)
Vallet, C.E., Physical chemistry of molten-salt batteries. Final report, October 1, 1981-September 30, 1982. LiCl precipitation from LiCl-KCl anolyte in porous Li-Al electrodes, 8:33783 (R;US)
Valli, K., *See* Hoffman, S., 8:33219
Van Brunt, R.J., Corona-induced decomposition of SF_6, 8:33640 (RA;US)
van den Broek, W.M.G.T., Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations, 8:33229 (R;NL)
Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt, 8:33231 (R;NL)
van der Leeden, G.A., *See* Young, R.T., 8:33359
van der Leun, J.C., *See* de Gruijl, F.R., 8:34663
van der Veen, T., *See* Brusegan, A., 8:34815
Van Domselaar, H., *See* Williams, C.R., 8:33132
Van Gulick, L.A., Programmable calculator stress analysis, 8:34213 (R;US)
Slideline verification for multilayer pressure vessel and piping analysis, 8:33726 (R;US)
Van Holde, K.E., *See* Rill, R.L., 8:34501
Van Hoogenbemt, G.H., *See* Vanwormhoudt, M.C., 8:33362
Van Hook, R.I., Biomass, 8:33353 (RA;US)
Terrestrial ecology, 8:34423 (RA;US)
Van'kov, A.A., *See* Bakalov, T., 8:34839
van Otterloo, P.J., *See* Young, I.T., 8:34975
Van Winkle, W., Aquatic ecology section, 8:34454 (RA;US)
Vandegrift, G.F., *See* Danesi, P.R., 8:34076
Vanwormhoudt, M.C., System analysis of the interconnection of 5-kW solar panels with the power lines. Final report, 8:33362 (R;XE)

Varaiya, P., *See* Abed, E., 8:33652, 8:33657
Varlashkin, P.G., Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R;US)
Vartsky, D., *See* Cohn, S.H., 8:34512
Vaswani, A.N., *See* Cohn, S.H., 8:34512
Vechione, W.J., Automatic meteorological station system AN/TMQ-30 ( ). Final report, 8:34393 (R;US)
Vedel, J., New methods for preparing Cu_2S-CdS solar cell semiconductor materials. Final report, 8:33324 (R;XE;FR)
Veers, P.S., General method for fatigue analysis of vertical-axis wind-turbine blades, 8:33613 (R;US)
Velt, M., *See* Prochazka, H., 8:34376
Vejtasa, S., *See* Whitaker, R., 8:33812
Velthuys, B.R., *See* Golbeck, J.H., 8:34492
Ventura, A., *See* Maino, G., 8:34838
Ventura, E., *See* Ferreira, E.P., 8:34329
Verbeek, P.W., *See* Young, I.T., 8:34975
Verma, S.K., Erosion-corrosion of various alloys in a simulated coal gasification environment, 8:33006 (BA;US)
Vertebnyi, V.P., *See* Razbudey, V.F., 8:34817
Vesely, E.J., *See* Verma, S.K., 8:33006
Viccaro, P.J., *See* Shenoy, G.K., 8:34832
Vichinsky, E., *See* Pennathur-Das, R., 8:34477
Vigil, J.C., Nuclear reactor safety in the USA, 8:33749 (R;US)
Villa, M., NMR studies of fast-ion conductors, 8:34863 (R;US)
Villaume, M., Low-enthalpy geothermal energy for local heating. Final report, 8:33567 (R;XE;FR)
Vincent, C., Critical avalanche size for impulse breakdown in quasi-uniform field SF_6 gaps, 8:34027 (RA;US)
Vincent, D., Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea, 8:33797 (R;DE)
Vita, D., *See* Marcheske, M., 8:33517
Vlastos, A.E., Pressure dependence of dc breakdown voltage and current for SF_6 in the inhomogeneous field, 8:34023 (RA;US)
Vliet, G.C., Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R;US)
Vocke, R.W., *See* Henning, R.J., 8:33071
Voegeli, B., MEGA (Mechanical Engineering General Analysis) user's document, 8:34967 (R;US)
Voelker, F., Array of 1- to 2-GHz electrodes for stochastic cooling, 8:34288 (R;US)
See Goldberg, D.A., 8:34285
Voelker, F.V., *See* Lambertson, G.R., 8:34316
Voelker, P., *See* Pfeiffer, W., 8:34030
Vogl, W., *See* Manzel, R., 8:33727
Vollequc, P.G., Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R;US)
von Deuster, E., *See* Connick, R.E., 8:34104
von Diest, G., *See* Langhoff, J., 8:32944
von Ehrenstein, D., *See* Altner, G., 8:33847
Von Zweygbergk, S., Investigation of a new type of generators without rotor windings to be used for wave energy conversion, 8:33582 (R;SE;In Swedish)
VonDomselaar, H., *See* Wesson, T.C., 8:33133
Vorogushin, M.F., *See* Malyshev, I.F., 8:34267
Voskanyan, M.A., *See* Muradyan, G.V., 8:34837
Voss, A., *See* Schmitz, K., 8:33827
Voss, R., *See* Renger, G., 8:34582
Voss, R.G.P., Nuclear structure facility at Daresbury, 8:34325 (BA;US)
Votockova, I., *See* Spurny, F., 8:34371
Vugts, J.H., *See* Bosma, J., 8:34679
Vuletich, T., *See* Derenzo, S.E., 8:34378

W

Wacholder, E., *See* Kaizerman, S., 8:33674
Wade, H., *See* Kirby, J., 8:33520
Wadsworth, F.L., Examination of mechanical snubbers from TMI-2. Final report, 8:33743 (R;US)
Wagemans, C., ^{235}U (n,f) cross section measurements and normalization problems, 8:34842 (J;US)
Wagenaar, L.B., *See* Dale, S.J., 8:33633
Wagner, M.R., *See* Fite, J., 8:33702
Wagner, P., *See* Frick, G., 8:34340
Wagschal, J.J., *See* Salmi, U., 8:33732
See Yaari, A., 8:33710
Wahi, K.K., *See* Ortiz, N.R., 8:33221
Wahl, G., *See* Lindgren, H., 8:33583
Wahlborg, A., *See* Meeks, J., 8:34165
Wakeham, W.A., *See* Kestin, J., 8:34103
Waki, T., *See* Emery, A.F., 8:33479
Wald, S., *See* Stokstad, R.G., 8:34808
Walentowicz, R., OTEC and the EPA permitting process, 8:33299 (RA;US)
Walker, J., *See* White, L., 8:34666
Walker, R.B., Supercomputer requirements for theoretical chemistry, 8:34168 (J;US)
Walker, R.S., *See* Wadsworth, F.L., 8:33743
Walker, S.P., Fission gas effects in fast reactor disassembly, 8:33776 (B;GB)
Walker, T.E., *See* London, R.E., 8:34157
Walsh, T., *See* Marcheske, M., 8:33517
Walsh, V., Approaching the retrofitting market successfully, 8:33314 (J;US)
Walve, K., Swedish state power board, 8:33595 (RA;DE)
Wanderer, P., *See* Aronson, S., 8:34747
Wang, C.Y., Theory and application of a three-dimensional code SHAPS to complex piping systems, 8:33740 (R;US)
Wang, F.T., Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R;US)
Wang, J.T., ESR spectra and structure of the n-butane and n-hexane radical cations, 8:34198 (J;NL)
Wang, S.Y., Study of the molecular basis for radiation mutagenesis. Final progress report, 8:34574 (R;US)
Wang, T.C., *See* Chen, B., 8:33424
Wang, T.G., *See* Lee, M.C., 8:34911
Wang, T.W., *See* Tennant, R.W., 8:34606
Wang, X., Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry, 8:33107 (RA;US)
Ward, D.C., Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R;US)
Ward, R.C., Balancing the generalized eigenvalue problem, 8:34892 (J;US)
Ware, A.A., Non-Maxwellian ion distributions caused by neoclassical heat conduction, 8:34894 (R;US)
Ware, M.W., *See* Froelich, D.A., 8:33025
Warner, C.L., Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report, 8:33246 (R;US)
Warner, C.W., *See* Caldwell, M.M., 8:34652
Warren, N., Determination of crack porosity from ratios of static and dynamic bulk moduli, 8:33573 (RA;US)
Elberton granite: a compendium of velocities, dynamic moduli and related physical properties, 8:33576 (RA;US)
Microcrack formation and hysteresis under hydrostatic cycling, 8:33574 (RA;US)
Quantitative petrostructure analysis, 8:33571 (RA;US)
Relation of well-log velocities and magnetic susceptibilities to laboratory value: Conway granites, White Mountains, New Hampshire, 8:33555 (RA;US)
Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982, 8:33569 (R;US)
Statistical characterization of complex crack and petrographic texture: application to predicting bulk physical properties, 8:33570 (RA;US)
Velocities and dynamic moduli of five EE2 borehold samples: technical summary report, 8:33575 (RA;US)
See Fisher, H., 8:33572
Wasson, O.A., *See* Meier, M.M., 8:34843
Watari, F., Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA;US)
Waters, R.T., *See* Davies, A.J., 8:34029
See Oakeshott, D.F., 8:33628
Watson, W.B., Modeling and monitoring a LAN, 8:34969 (R;US)
Watts-Fitzgerald, T.A., United States Coast Guard and OTEC development, 8:33397 (RA;US)
Weare, J.H., Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C, 8:33577 (R;US)
Webb, P.G., *See* Biggs, R.H., 8:34647
Webber, R.J., Erythropoietin studies: purification from urine and production of monoclonal antibodies, 8:34480 (RA;US)
Weber, B.J., Use of serum progesterone levels to detect pregnancy in elk, 8:34567 (J;US)
Weber, G., *See* Andelfinger, C., 8:34927
Weber, T., *See* Crisciani, F., 8:34872

See Ghirardi, G.C., 8:34869, 8:34871
Webman, I., *See* Tobochnik, J., 8:34018
Webster, T., *See* Place, W., 8:33894
Webster, W.C., *See* Donnelly, J.R., 8:33052
Weeren, H.O., New hydrofracture facility at ORNL, 8:33194 (RA;US)
See Stinton, D.P., 8:33196
Wegner, M., *See* Reil, J., 8:33887
Wehring, B.W., *See* Hertel, N.E., 8:34859
Weible, H., Economic consequences of the delay in the nuclear energy developing programme in Baden-Wuerttemberg considering topical cost-analyses on the power generation sector, 8:33813 (R;DE;In German)
Weidner, H., *See* Knoepfel, P., 8:33801
Weidt, J.L., *See* Thorstenson, J., 8:33537
Weil, J.L., ^{12}C + n polarization measurements and the carbon standard, 8:34805 (J;US)
Weimer, W.C., *See* Laul, J.C., 8:34065
Weinberg, I., Effects of processing and dopant on radiation damage removal in silicon solar cells, 8:33330 (R;US)
Weingarten, R., *See* Eisen, Y., 8:34357
See Faermann, S., 8:34360
Weinzierl, P., Project "usage of hydrogen for purposes of energy technology", 8:33263 (R;AT;In German)
Weir, B.A., *See* Albanese, J.R., 8:34668
Weiss, W., *See* Renger, G., 8:34582
Weisser, D.C., Survey of large NEC accelerators: 1981, 8:34328 (BA;US)
Weitekamp, D.P., Time-domain multiple-quantum NMR, 8:34795 (R;US)
Welch, B., *See* Schuck, L., 8:33925
Wellmann, E., Phenylpropanoid pigment synthesis and growth reduction as adaptive reactions to increased UV-B radiation, 8:34655 (RA;DE)
Wells, J.S., *See* Patterson, C.W., 8:34106
Welsh, W.J., *See* McWhinney, R.T., 8:33865
Wen, C.Y., Optimization of fixed bed methanation processes, 8:33271 (J;US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R;US)
Wensierski, P., *See* Patil, M., 8:33549
Wenzel, W., *See* Kurth, M., 8:32984
Werner, C., *See* Wieder, A., 8:34244
Wesson, T.C., Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R;US)
West, S.H., *See* Biggs, R.H., 8:34647
West, W.L., Tank 16 demonstration: single-pump test results, 8:33210 (R;US)
Westberg, S., Testing of a small Darrieus turbine. Final report, 8:33608 (R;SE;In Swedish)
Westlake, D.W.S., Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA;US)
Westlin, P.R., Continuous emission monitoring of flue gas desulfurization systems, 8:34398 (RA;US)
Westmacott, K.H., Life beyond 1 MeV, 8:34388 (BA;US)
Weston, A., *See* Moses, V., 8:33124
See Springham, D.G., 8:33125
Wetmore, S.B., *See* Borchardt, D.R., 8:33389
Wetzel, R.G., Longterm dissolved and particulate alkaline phosphatase activity in a hardwater lake in relation to lake stability and phosphorus enrichments, 8:34447 (J;DE)
See Beer, S., 8:34491, 8:34510
See Crumpton, W.G., 8:34563
See Francko, D.A., 8:34445, 8:34457, 8:34507, 8:34562
See Grace, J.B., 8:33360
See Stewart, A.J., 8:34442, 8:34446
Wetzl, R.G., *See* Stewart, A.J., 8:34448
Wexler, A., *See* Martin, M., 8:33526
Wexler, A.H., *See* Atkinson, B.A., 8:33465
Wheeler, G.L., *See* Bitensky, M.W., 8:34487
Wheeler, M.A., *See* Bitensky, M.W., 8:34487
Whiddon, W.I., *See* Hart, K., 8:33502
Whinnery, W.N., Evaluation of alternatives for treatment of PGDP steam plant fly ash, 8:33018 (RA;US)
Fungicide treatment for cooling tower redwood, 8:33239 (RA;US)
Whitaker, R., How power options stack up, 8:33812 (J;US)
White, D.L., *See* Durbin, P.W., 8:34206
White, G.C., *See* Weber, B.J., 8:34567
White, L., Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82, 8:34666 (R;US)
White, S.K., *See* Jenkins, R.A., 8:34402
Whitlow, G.A., *See* Spengler, C.J., 8:33979
Whitman, D.L., Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA;US)
Whittaker, R.J., *See* Nicklin, T., 8:33141
Wieber, P.R., Fossil energy's role in synthetic fuels, 8:33097 (RA;US)
Wiedenbeck, P., *See* Perez-Mendez, V., 8:34379
Wieder, A., Development and application of process and device-simulation for 2μm MOS technology, 8:34244 (R;DE;In German)
Wiehl, H.J., Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4, 8:34688 (R;US)
Wier, P.U., *See* Westberg, S., 8:33608
Wierzbicki, J., *See* Alfimenkov, V.P., 8:34798
Wigley, D.A., The metallurgical structure and mechanical properties at low temperature of Nitronic 40 with particular reference to its use in the construction of models for cryogenic wind tunnels, 8:33997 (R;US)
Wilcox, B.A., *See* Atkinson, B.A., 8:33465
Wilcox, R.P., Monticello: an early American prototype for solar architecture, 8:33536 (J;US)
Wilcox, W.R., *See* Subramanian, R.S., 8:34741
Wild, J.F., Plutonium separations, 8:34060 (R;US)
Wiley, J.D., Annealing studies of amorphous alloys, 8:34247 (R;US)
Wilhelmsen, G., *See* Hakkila, P., 8:33876
Wilke, C.R., *See* Mancuso, A., 8:33275
Williams, C.R., Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R;US)
Williams, C.W., Analysis of the Bergstedt residence. A double envelope house in Duluth, Minnesota, 8:33419 (J;US)
Williams, F., *See* Wang, J.T., 8:34198
Williams, J.M., New $(TMTSF)_2X$ derivatives: a change in the selenium network dimensionality derived from the molecular and crystal structures of $(TMTSF)_2(FSO_3)$[T = 298K, 123K] and $(TMTSF)_2(BrO_4)$ T = 298K, 8:34109 (J;GB)
Williams, L.R., Unique and multiple solutions of a family of differential equations modeling chemical reactions, 8:34102 (J;US)
Williams, P., *See* Krauss, R.M., 8:34484
Wilmot, W.G., Designs for a zero-energy elementary school in Oregon, 8:33519 (J;US)
Wilner, L., Control of photosensitized electron transfer reactions in organized interfacial systems: vesicles, water-in-oil microemulsions, and colloidal silicon dioxide particles, 8:33261 (J;US)
Wilson, A., Temperature extremes in vertical collectors, 8:33546 (J;US)
Vandal resistance properties of solar glazing materials, 8:33544 (J;US)
Wilson, D.D., *See* Douglass, D.A., 8:33658
Wilson, J.L., Commercial aspects of OTEC power cable manufacture, 8:33383 (RA;US)
Wilson, J.R., *See* Hwang, D.Q., 8:34903
Wilson, J.W., *See* Wong, M., 8:34752
Wilson, S.R., *See* Bhattacharya, R.S., 8:34045
Wiltsee, G.A., Evolution of the UND-government-industry partnership in low-rank coal research, 8:32941 (R;US)
Windawi, H., *See* Moon, S.H., 8:34171
Windheim, L.S., Substitution of daylighting for electric lighting in a large office building, 8:33922 (J;US)
Winkler, W., *See* Ruediger, A., 8:34882
Winn, B, *See* Franta, G., 8:33506
Winn, C.B., Simple method for determining the average temperature, the temperature variation and the solar fraction for passive solar buildings, 8:33455 (J;US)
Winn, J.S., *See* Goble, J.H., 8:34124
Winters, M.H.W., Development trends of nuclear risk insurance in Brazil, 8:33778 (B;BR;In Portuguese)
Wipke, W.T., Computer-guided exploration of synthetic pathways. Final progress report, 8:34093 (R;US)
Wiszbak, K., Determination of the capture width of the 27.7 keV s-wave resonance in ^{56}Fe, 8:34814 (J;US)
See Beer, H., 8:34833
See Kaeppeler, F., 8:34811
Wodinsky, I., *See* Crawford, E.J., 8:34508
Woebkenberg, M.L., Personal passive monitors for chemical agents. Technical report, 8:34404 (R;US)
Wogman, N.A., *See* Laul, J.C., 8:34065
Wohl, C.G., Current experiments in elementary-particle physics, 8:34750 (R;US)
Wold, J.S., Project Thunderbird: a nuclear trigger for coal gasification, 8:33011 (J;US)

Wolf, A.P., *See* Crawford, E.J., 8:34508
Wolf, T., *See* Aiken, R. L., 8:34070
Wolf, W., *See* Haas, H., 8:34218
Wolfe, D.E., Food and fuel: round two, 8:33521 (J;US)
Wolfe, G.W., Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J;US)
Wolfe, M.L., *See* Weber, B.J., 8:34567
Wolgast, R., *See* Gilbert, W., 8:34319
Wolgast, R.C., *See* Reimers, R.M., 8:34315
Wolowski, E., *See* Langhoff, J., 8:32944
Wolson, R.D., Development of on-line monitoring device to detect the presence/absence of sodium vapor, 8:33191 (R;US)
Wong, C.K., *See* Voegeli, B., 8:34967
Wong, C.M., *See* Crawford, R.W., 8:34149
Wong, M., Transport studies of the interaction of high-energy heavy ions with extended matter, 8:34752 (RA;US)
Woo, T.W., Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J;US)
Wood, P., *See* Krauss, R.M., 8:34484
Wood, R.F., *See* Young, R.T., 8:33359
Woodcock, K., *See* Ban, S., 8:33098
Woodland, L.R., *See* Kaplan, N., 8:33031
Woodruff, K.H., *See* Fabrikant, J.I., 8:34550
Woodward, T.C., *See* Wold, J.S., 8:33011
Worlton, W.J., *See* Buzbee, B.L., 8:34970
Wormley, D.N., Ocean Thermal Energy Conversion plant dynamic simulation models, 8:33396 (RA;US)
Worrest, R.C., Impact of enhanced solar UV-B radiation upon the marine ecosystem, 8:34661 (RA;DE)
See Caldwell, M.M., 8:34575
Wortman, E.J., Availability of offshore industry technology for construction of ocean energy facilities, 8:33386 (RA;US)
Wright, H.A., *See* Todo, A.S., 8:34855
Wright, I.G., *See* Nagarajan, V., 8:33091
Wright, K.A., *See* Bodle, W.W., 8:33268
Wright, W.V., *See* Lee, L.M., 8:33205
Wu, F.F., Analysis of power flows without solving power flow equations, 8:33655 (R;US)
Power-system security assessment and control, 8:33650 (R;US)
See Kaye, R.J., 8:33653, 8:33654, 8:33656
Wudl, F., *See* Williams, J.M., 8:34109

X

Xu, S., *See* Lai, W., 8:34295

Y

Yaari, A., Leakage importance, 8:33710 (RA;IL)
See Salmi, U., 8:33732
Yajima, N., *See* Kako, F., 8:34737
Yamakoshi, H., *See* Kitazawa, H., 8:34827
Yamamoto, R.M., *See* Reimers, R.M., 8:34315
Yamamoto, T., Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R;US)
See Hino, Y., 8:34810
Yamanouti, Y., Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni, 8:34813 (J;US)
Yamashita, T., *See* Uehara, H., 8:33392
Yamazaki, A., Reciprocal effects of an inhibitory factor on catalytic activity and noncatalytic cGMP binding sites of rod phosphodiesterase, 8:34488 (J;US)
See Bitensky, M.W., 8:34487
Yanev, T.B., *See* Mikhajlov, M.N., 8:34377
Yang, T.C., Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells, 8:34593 (RA;US)
Radiation survival studies with cultured normal human mammary epithelial cells, 8:34592 (RA;US)
Yang, T.C.H., *See* Tobias, C.A., 8:34594
Yang, W.K., *See* Tennant, R.W., 8:34572, 8:34606
Yanle, R.R., *See* Esipov, A.A., 8:34474
Yano, Y., Radionuclide generators and cyclotron produced positron emitters for synthesis of biochemical substrates, 8:34544 (RA;US)
See Friedland, R.P., 8:34543
Yaouanc, A., Possibility of studying crystal-field levels and excitations by μ^+ SR spectroscopy, 8:34864 (R;US)
Yarbrough, H.F., Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas, 8:33123 (RA;US)
Yarden, A.L., Application of OTEC-1 performance and fabrication cost data to estimation of OTEC power system cost, 8:33381 (RA;US)
Yared, R., Energy savings and conservation, 8:33823 (J;AT)
Yee, J.H., Review of the physics and response models for burnout of semiconductor devices, 8:34249 (R;US)
Yelvin, Y., *See* Salmi, U., 8:33732
Yen, T.F., *See* Jang, L.K., 8:33110
Yezzi, M.J., *See* Tobias, C.A., 8:34594
Yiftah, S., *See* Bartal, Y., 8:33714, 8:33715, 8:33716
See Caspo, N., 8:33713, 8:33723
See Gur, Y., 8:33720
Yntema, J., *See* DenHartog, P., 8:34339
Yoffe, J.A., Rules for S(-2k) dipole sums, 8:34733 (J;DE)
Yokoyama, K., *See* Fukuda, T., 8:34784, 8:34785
Yoshioka, A., *See* Nakanishi, K., 8:33637
Yoshizawa, Y., Study on the ignition of a fuel droplet in high temperature stagnant gas, 8:34211 (R;US)
Yoshizumi, T., Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA;US)
Young, A.T., *See* Lee, M.C., 8:34911
Young, D.A., *See* Carter, J., 8:34253
Young, F.C., *See* Mehlhorn, T.A., 8:34939
Young, I.T., New implementation for the binary and minkowski operators, 8:34975 (J;US)
Young, J.P., *See* Haire, R.G., 8:34205
Young, R.T., Studies of grain boundaries in small-grained polycrystalline silicon solar cells, 8:33359 (J;US)
Youngberg, A.D., *See* Burns, L.K., 8:32994
Youngberg, D., *See* Levie, B.E., 8:32980
Youngblood, R., *See* Ilberg, D., 8:33764
Yourd, R., *See* Abbott, S., 8:34271
Yuan, L.C.L., *See* Dell, G.F., 8:34754
Yung, D., *See* Lorenz, J.J., 8:33399
Yurek, G.J., Oxidation of chromium in H_2-H_2O-H_2S gas mixtures, 8:33984 (BA;US)
Yushkov, A.V., *See* Esipov, A.A., 8:34474
Yust, C.S., Low-speed sliding damage in TiB_2-Ni composites, 8:34009 (R;US)

Z

Zabel, J.C., *See* Heames, T.J., 8:34262
Zajtsev, M.G., Moessbauer spectra processing by the method of distribution function reconstruction by means of quadrupolar splitting, 8:34542 (RA;SU;In Russian)
Zalkin, A., Synthesis and structure of dicyclopentenouranocene $U[C_8H_8(CH_3)_3]_2$, 8:34207 (J;US)
Zaluzec, N.J., Geometry of the absorption correction for analytical microscopy, 8:34083 (BA;US)
Limitations of AEM-based x-ray microanalysis, 8:34079 (BA;US)
Propagation of errors in quantitative AEM microanalysis by XEDS and EELS, 8:34084 (BA;US)
Zanzi, I., *See* Cohn, S.H., 8:34512
Zapp, P.E., Effects of tritium in elastomers, 8:34015 (R;US)
Zee, A., Non-empty universe, 8:34680 (R;US)
Zhang, Z., Survey of research on the application of microbial techniques to the petroleum production in China, 8:33121 (RA;US)
Zhang Yuan-zhong, Approximate solution with torsion for a charged particle in a gauge theory of gravitation, 8:34874 (R;XA)
Possibility of a fourth test of general relativity in earth's gravitational field, 8:34873 (R;XA)
Zhdanov, V.S., *See* Babenkov, M.I., 8:34724
Zhiyong, Z., *See* Fujimoto, Y., 8:34776
Zhu, X., *See* Lai, W., 8:34295
Ziegenbein, B., *See* Birnbreier, H., 8:33888
Zielinski, R.E., Instrumentation for optimizing an underground coal gasification process, 8:32998 (J;US)
Zimmerman, G.P., *See* Krishnan, R.P., 8:34256
Zimmerman, T., *See* Kvick, T., 8:33588
Zinkann, G.P., *See* Shepard, K.W., 8:34264
Zoellick, B., Predicted and observed performance of a buried earth-air heat exchanger cooling system, 8:33533 (J;US)
Zoelzer, F., Wavelength dependence of inactivation and mutagenesis in a eucaryotic model system, 8:34579 (RA;DE)

Zuern, R., Bibliography of the electric power industry of Wuerttemberg, 8:33869 (R;DE;In German)

Zumbroich, H., Simple method for evaluation of the maximum thermal residual stresses in multi-layer external structural members, 8:33897 (R;DE;In German)

Zweig, P.R., *See* Burton, J.W., 8:33434

SUBJECT INDEX

The subject index is based on the use of subject descriptors selected from a controlled thesaurus of terms (DOE/TIC-7000). Subject descriptors and qualifiers (subheadings) are selected and presented in the following format:

SUBJECT DESCRIPTOR
Qualifier
Title, (supplementary information), citation number, (R:US)

The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processes applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept. (e.g. Pipeline Quality Gas see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, VA 22161.

A

ABANDONED SITES
Fires
Controlled burnout at an abandoned coal mine fire, 8:33059 (RA:US)

ABNORMALITIES (DEVELOPMENTAL)
See MALFORMATIONS

ABSORBERS (SOLAR)
See SOLAR ABSORBERS

ABSORPTION SPECTROSCOPY
Comparative Evaluations
Colorimetric and titrimetric quantitation of ammonia in oil shale wastewater, 8:33172 (RA:US)
Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters, 8:33173 (RA:US)

ACCELERATOR FACILITIES
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R:US)
Comparative Evaluations
Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee, 8:34312 (R:US)
Recommendations
Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee, 8:34312 (R:US)

ACCELERATORS
See also ELECTROSTATIC ACCELERATORS
HEAVY ION ACCELERATORS
LINEAR ACCELERATORS
Isotope Production
Accelerators for radionuclide production, 8:33258 (J:US)
Planning
NELMA project. I. Objectives of the methodical aspects (Nuclear Energy Laboratory of Medical and Agricultural Sciences), 8:34280 (J:US)

ACCIDENTAL IRRADIATION
See RADIATION ACCIDENTS

ACES
See QUARKS

ACETALDEHYDE
Toxicity
Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R:US)

ACETIC ACID
Aerobic Digestion
Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R:US)
Thermal Conductivity
Study of vapor phase association in an acetic acid-water binary mixture by measurement of thermal conductivity and molecular orbital calculations, 8:34143 (BA:US)

ACETIC ALDEHYDE
See ACETALDEHYDE

ACETYLACETONE
Isomerization
Nuclear magnetic resonance, paramagnetic ion induced relaxation method to differentiate between 1,3-diketo and 1,3-keto-enol isomers, 8:34131 (J:US)
NMR Spectra
Nuclear magnetic resonance, paramagnetic ion induced relaxation method to differentiate between 1,3-diketo and 1,3-keto-enol isomers, 8:34131 (J:US)

ACID ELECTROLYTE FUEL CELLS
Electrocatalysts
Studies on iron and cobalt phthalocyanine catalysts for the electrochemical reduction of oxygen with special emphasis on their stability in acid electrolyte, 8:33884 (R:SE)
Performance Testing
Crude gas/air fuel cells with fixed phosphoric acid, 8:33881 (R:DE:In German)

ACID RAIN
Environmental Effects
Terrestrial ecology, 8:34423 (RA:US)
Meetings
Contact conference on acidification. Lectures, 8:33060 (R:SE:In Swedish)
Sweden
Calculation of sulfur precipitation on a national scale (In Sweden), 8:33062 (R:SE:In Swedish)

ACID SULFITES
Dimerization
Equilibrium constant for the dimerization of bisulfite ion to form $S_2O_5^{2-}$, 8:34104 (J:US)

ACIDS (ORGANIC)
See ORGANIC ACIDS

ACTINIDE NUCLEI
See also CALIFORNIUM 252
NEPTUNIUM 237
PLUTONIUM 238
PLUTONIUM 239
PLUTONIUM 240
PROTACTINIUM 234
URANIUM 238
Neutron Reactions
New fission fragment detectors for cross section and angular distribution measurements at CBNM, 8:34382 (J:US)
ACTINIDES
See also AMERICIUM
CALIFORNIUM
NEPTUNIUM
PLUTONIUM
URANIUM
Stereochemistry
New sequestering agents for the actinides, 8:34206 (RA:US)
ACTINIUM D
See LEAD 207
ACTIVATED CARBON
Sorptive Properties
Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R:DE:In German)
Adsorption of propane on activated carbon at 25°C, 8:34162 (J:GB)
Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R:US)
ACTIVATION ANALYSIS
Statistical Data
Prompt nuclear analysis: growth and trends. A scientometric study, 8:34062 (J:CH)
ACTIVATION DETECTORS
Corrections
Parasitic absorption and leakage corrections for $MnSO_4$ baths, 8:34383 (J:US)
Performance
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
ADAMANTANE
Radioprotective Substances
Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80, 8:34571 (R:US)
Radiosensitivity Effects
Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80, 8:34571 (R:US)
ADENOCARCINOMAS
See CARCINOMAS
ADENOSINE MONOPHOSPHATE
See AMP
ADIPIC ACID
Buffer additives for limestone scrubbing: a review of R and D results, 8:33037 (RA:US)
Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA:US)
Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers, 8:33038 (RA:US)
ADSORBENTS
See also ACTIVATED CARBON
Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982 (Iron orthosilicate, cobalt titanate, iron chromite, cobalt aluminate, manganous oxide), 8:32952 (R:US)
Bench-Scale Experiments
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
Screening
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
ADULTS
Blood Plasma
Apolipoprotein E in umbilical cord blood plasma, 8:34552 (RA:US)
AEROSOLS
See also RADIOACTIVE AEROSOLS
Binding Energy
Studies of gas-phase clusters: the solvation of HNO_3 in microscopic aqueous clusters, 8:34120 (J:NL)
Brownian Movement
Lead aerosol Brownian collision rates at normal and elevated temperature: theory, 8:34098 (J:US)
Chemical Analysis
Composition of the aerosol of a clean air region. Final report, 8:34399 (R:SE:In Swedish)
Meetings
Aerosols in science, medicine, and technology. Aerosols in and from industrial processes, 8:33184 (R:DE:GE)
Particle Size
Composition of the aerosol of a clean air region. Final report, 8:34399 (R:SE:In Swedish)
Sampling
Mount St. Helens aerosol evolution, 8:34395 (R:US)
AFR STORAGE
See AWAY-FROM-REACTOR STORAGE
AGRICULTURAL RESIDUES
See AGRICULTURAL WASTES
AGRICULTURAL WASTES
See also MANURES
Availability
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
Gasification
Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane., 8:33351 (R:SE)
Liquefaction
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
AGRICULTURE
NELMA project. I. Objectives of the methodical aspects (Nuclear Energy Laboratory of Medical and Agricultural Sciences), 8:34280 (J:US)
AIR
Breakdown
Air insulation behaviour under oscillating impulses, 8:33631 (RA:US)
Comments on the Carrara-Thione breakdown model of long air gap during positive switching surges, 8:33632 (RA:US)
Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA:US)
Non-uniform field breakdown: engineering models, 8:33628 (RA:US)
Parameters influencing the switching surge strength of transmission line air insulation, 8:33630 (RA:US)
Positive switching impulse breakdown of sphere-plane gaps in dry and moist air, 8:34029 (RA:US)
Corona Discharges
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA:US)
Dielectric Properties
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Dusts
Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA:US)
Electric Sparks
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA:US)
Mixtures
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Ozonization
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)

Photoionization
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)

AIR POLLUTION
See also INDOOR AIR POLLUTION
Diffusion
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III, 8:34408 (R:US)
ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I, 8:34406 (R:US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II, 8:34407 (R:US)
Two-dimensional simulation of drainage flow and tracer gas transport in the Geysers area, 8:34397 (R:US)
Environmental Effects
Terrestrial ecology, 8:34423 (RA:US)
Environmental Transport
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III, 8:34408 (R:US)
ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I, 8:34406 (R:US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II, 8:34407 (R:US)
Two-dimensional simulation of drainage flow and tracer gas transport in the Geysers area, 8:34397 (R:US)
Monitoring
Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur, 8:34410 (BA:US)

AIR POLLUTION CONTROL
Use this term for items that involve the removal or management of pollutants after they are formed by a source.
Environmental Policy
Formulation and implementation of air quality control programmes, 8:33801 (R:DE)

AIR POLLUTION MONITORS
Indicator of air contamination with radioactive iodine isotopes, 8:33259 (RA:CS:In Czech)
Aerial Monitoring
Aerial testing of KrF-laser-based fluorosensor, 8:34386 (R:US)
Design
Development of sampling and analytical method for styrene oxide, 8:34068 (J:US)
Evaluation
Evaluation of a prototype portable microwave multi-gas analyzer. Technical report, 8:34405 (R:US)
Flight Testing
Aerial testing of KrF-laser-based fluorosensor, 8:34386 (R:US)
Positioning
Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur, 8:34410 (BA:US)

AIR SAMPLERS
Design
Air sampling and liquid chromatographic determination of ethylenimine, 8:34409 (J:US)

AIRBORNE PARTICLES
See PARTICULATES

AIRBORNE PARTICULATES
See PARTICULATES

ALABAMA
Coal Deposits
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)
Industrial Plants
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)

ALAP
See RADIATION PROTECTION

ALARM SYSTEMS
Human Factors Engineering
Near-term improvements for nuclear power plant control room annunciator systems (PWR; BWR), 8:33730 (R:US)
Modifications
Near-term improvements for nuclear power plant control room annunciator systems (PWR; BWR), 8:33730 (R:US)

ALASKA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

ALBEDO-NEUTRON DOSEMETERS
Performance
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)

ALDEHYDO ACIDS
See CARBOXYLIC ACIDS

ALEUTIAN ISLANDS
Ecosystems
Criconematina (nematoda: tylenchida) from the Aleutian Islands, 8:34437 (J:US)
Three new species of heteroderoidea (nematoda) from the Aleutian Islands, 8:34438 (J:US)
Nematodes
Three new species of heteroderoidea (nematoda) from the Aleutian Islands, 8:34438 (J:US)

ALFALFA
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)

ALGAE
See also DIATOMS
Anaerobic Digestion
Methane fermentations. End product inhibition, thermophilic methane formation and production of methane from algae, 8:33329 (R:SE)
Metabolism
Dynamics of cellular and extracellular cAmp in Anabaena flos-aquae (cyanophyta): intrinsic culture variability and correlation with metabolic variables, 8:34562 (J:US)

ALKALINE PHOSPHATASE
Code number 3.1.3.1.
Enzyme Activity
Longterm dissolved and particulate alkaline phosphatase activity in a hardwater lake in relation to lake stability and phosphorus enrichments, 8:34447 (J:DE)

ALKANES
See also BUTANE
CYCLOALKANES
ETHANE
HEPTANE
HEXANE
METHANE
PROPANE
Chemical Reaction Yield
$CO + H_2$ reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
Liquid Column Chromatography
Comments on column characterization: a sulfur column, 8:34069 (J:DE)

ALKANOIC ACIDS
See CARBOXYLIC ACIDS
ALKENES
See also BUTENES
CYCLOALKENES
ETHYLENE
PROPYLENE
Chemical Reaction Yield
$CO + H_2$ reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
ALKENOIC ACIDS
See CARBOXYLIC ACIDS
ALKYL RADICALS
Electron Spin Resonance
ESR spectra and structure of the n-butane and n-hexane radical cations, 8:34198 (J:NL)
ALKYLATING AGENTS
Toxicity
Zinc-induced resistance to alkylating agents: lack of correlation between cell survival and metallothionein content, 8:34641 (J:US)
ALLOY 800
See INCOLOY 300
ALLOY-HD-8077
See NICKEL BASE ALLOYS
ALLOY-HT-9
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
ALLOY-MA-754
See NICKEL BASE ALLOYS
ALLOY-MA-956
See IRON BASE ALLOYS
ALLOYS
See also ALUMINIUM ALLOYS
BERYLLIUM ALLOYS
CALCIUM ALLOYS
CHROMIUM ALLOYS
COBALT ALLOYS
COPPER ALLOYS
GOLD ALLOYS
HEAT RESISTING ALLOYS
IRON ALLOYS
LEAD ALLOYS
MOLYBDENUM ALLOYS
NICKEL ALLOYS
NIOBIUM ALLOYS
SILICON ALLOYS
TUNGSTEN ALLOYS
VANADIUM ALLOYS
ZINC ALLOYS
ZIRCONIUM ALLOYS
Corrosion
Erosion-corrosion of various alloys in a simulated coal gasification environment, 8:33006 (BA:US)
Hot corrosion/fouling of metals beneath surface deposits, 8:33985 (BA:US)
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Mechanism of corrosion in multiple component gases at high temperatures, 8:33977 (BA:US)
Erosion
Erosion-corrosion of various alloys in a simulated coal gasification environment, 8:33006 (BA:US)
Erosion of metal alloys and their scales, 8:33978 (BA:US)
Fouling
Hot corrosion/fouling of metals beneath surface deposits, 8:33985 (BA:US)
ALLOY-WAZ-16
See NICKEL BASE ALLOYS
ALPHA DOSIMETRY
Dielectric Track Detectors
Saturation effects in polycarbonates irradiated at high doses, 8:34360 (RA:IL)
Radiation Effects
Saturation effects in polycarbonates irradiated at high doses, 8:34360 (RA:IL)
ALPHA PARTICLES
Emitted by nuclei.
Radioecological Concentration
Atmospheric monitoring, 8:34418 (RA:US)
ALPHA REACTIONS
Cross Sections
Simple parameterization for optical reaction cross sections, 8:34850 (J:US)
ALPHA-BEARING WASTES
Packaging
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
ALTERNATE FUELS
See FUEL SUBSTITUTION
SYNTHETIC FUELS
ALTITUDE
Calculation Methods
Fine tuning solar access: calculators and computers as design tools, 8:33471 (J:US)
ALUMINIA
See ALUMINIUM OXIDES
ALUMINIUM
Activation Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
Electrophoresis
Aluminum electromigration lifetime variations with linewidth: the effects of changing stress conditions (Metallization for integrated circuits), 8:34248 (R:US)
Erosion
Erosion of metal alloys and their scales, 8:33978 (BA:US)
Fabrication
Submicron, unbacked, shaped metal foils, 8:33962 (R:US)
Photoionization
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
Physical Radiation Effects
Response of aluminum and its alloys to exposure in the high flux isotope reactor, 8:33735 (R:US)
Production
OTEC aluminum intergration studies, 8:33374 (RA:US)
Scanning Electron Microscopy
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
Sorptive Properties
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
X-Ray Fluorescence Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
ALUMINIUM 27 TARGET
Neutron Reactions
Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J:US)
Oxygen 16 Reactions
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R:US)
ALUMINIUM 31
Search for new isotopes at Brookhaven, 8:34809 (J:US)
ALUMINIUM ALLOYS
See also INCONEL 718
RENE 41
Physical Radiation Effects
Response of aluminum and its alloys to exposure in the high flux isotope reactor, 8:33735 (R:US)
Sulfidation
High temperature sulfidation properties of iron-chromium-base alloys, 8:33981 (BA:US)

ALUMINIUM CHLORIDES
Electric Conductivity
Electrical conductivity of molten mixtures of antimony(III) chloride-aluminum chloride and antimony(III) chloride-aluminum chloride-sodium chloride, 8:34111 (J:US)
Electrochemistry
Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$, 8:34173 (R:DE:In German)
ALUMINIUM IONS
Energy-Level Transitions
Lifetimes of low-lying $^2P^0$, ^2D, and $^2F^2$ states of the Al I isoelectronic sequence, 8:34730 (J:SE)
ALUMINIUM OXIDES
Catalytic Effects
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Further developments in the nickel/urania/α-alumina catalyst system, 8:33141 (J:GB)
Corrosion Resistance
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)
Crystal Structure
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
ALUMINUM
See ALUMINIUM
ALVEOLI (PULMONARY)
See LUNGS
AMERICAN INDIANS
Appropriate Technology
Native self-reliance, 8:33313 (J:US)
AMERICIUM
Leaching
Effect of radiolysis on leachability of plutonium and americium from 76-101 glass, 8:34042 (R:US)
AMERICIUM 241 TARGET
Neutron Reactions
First and second chance fission calculations for actinides and related topics, 8:34838 (J:US)
AMERICIUM COMPOUNDS
See also AMERICIUM IODIDES
Lattice Parameters
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
Spectrophotometry
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
AMERICIUM IODIDES
Lattice Parameters
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
Spectrophotometry
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
AMES TEST
See MUTAGEN SCREENING
AMIDES
See also FORMAMIDE
Aerobic Digestion
Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R:US)
AMINES
See also ANILINE
OXIMES
RHODAMINES
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Potentiometry
Microdetermination of aliphatic amines and polyamines with cupric ion: relationship between pK_1 and half-complexation potential, 8:34066 (J:US)
Microdetermination and pK/sub a/ measurement of some aliphatic amines using the copper-ion-selective electrode, 8:34082 (J:US)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
AMINO ACIDS
Organic acids containing both a basic amino group and an acidic carboxyl group.
See also KYNURENINE
PABA
THYROXINE
Agglomeration
Differential changes in ornithine aminotransferase self-affinity produced by exposure to basic amino acids and increases in the intrinsic electronegativity of the enzyme monomer, 8:34147 (J:US)
Ionization
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
NMR Spectra
Asymmetric NMR spectra of weakly coupled nuclei: a common characteristic in the ^{13}C NMR spectra of [U-^{13}C] labeled molecules and in natural abundance proton-coupled ^{13}C spectra, 8:34157 (J:GB)
Ultraviolet Spectra
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
AMINO ALCOHOLS
See AMINES
AMINO SUGARS
See AMINES
AMINOBENZENE
See ANILINE
AMINOBENZOIC ACID-PARA
See PABA
AMINOGLYCIDES
See AMINES
AMINOTRANSFERASES
Code number 2.6.1.
Agglomeration
Differential changes in ornithine aminotransferase self-affinity produced by exposure to basic amino acids and increases in the intrinsic electronegativity of the enzyme monomer, 8:34147 (J:US)
AMMONIA
Ocean Thermal Energy Conversion
OTEC produced ammonia: an alternative fuel, 8:33375 (RA:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Production
OTEC produced ammonia: an alternative fuel, 8:33375 (RA:US)
Quantitative Chemical Analysis
Colorimetric and titrimetric quantitation of ammonia in oil shale wastewater, 8:33172 (RA:US)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
AMNION CELLS
See EMBRYONIC CELLS
AMP
Biochemical Reaction Kinetics
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34457 (J:US)
Biosynthesis
Dynamics of cellular and extracellular cAmp in Anabaena flos-aquae (cyanophyta): intrinsic culture variability and correlation with metabolic variables, 8:34562 (J:US)
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34507 (J:US)
Ecological Concentration
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34457 (J:US)
Water Chemistry
Isolation of cyclic adenosine 3':5'-monophosphate (cAMP) from lakes of differing trophic status: Correlation with planktonic metabolic variables, 8:34445 (J:US)

ANALYSIS (ACTIVATION)
See ACTIVATION ANALYSIS
ANAPHASE
See MITOSIS
ANDROGENS
Receptors
Identification of androgen receptors in the male mouse lung, 8:34479 (RA:US)
ANEMOMETERS
Comparative Evaluations
Comparison of wind measurements performed by SODAR and cup anemometer on mast, 8:33587 (R:SE:In Swedish)
Frequency Response Testing
Investigating the Gill UVW-anemometer as a rugged turbulence instrument for wind power applications, 8:33615 (R:SE)
Sonar
Comparison of wind measurements performed by SODAR and cup anemometer on mast, 8:33587 (R:SE:In Swedish)
ANGRA-1 REACTOR
Containment Buildings
Analysis of the metallic containment integrity of Angra I (Loss of coolant pressure and temperature history; CONDRU-4 Code), 8:33745 (RA:BR:In Portuguese)
ANILINE
Shear Properties
Shear mechanical properties of free-standard liquid crystal films, 8:34154 (BA:US)
ANIMAL CELLS
Includes human cells.
See also EMBRYONIC CELLS
RESPIRATORY TRACT CELLS
TUMOR CELLS
Biological Radiation Effects
Radiation survival studies with cultured normal human mammary epithelial cells, 8:34592 (RA:US)
Genetic Mapping
Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants, 8:34617 (R:US)
Growth
Properties of human mammary epithelial cells in culture, 8:34497 (RA:US)
Karyotype
Properties of human mammary epithelial cells in culture, 8:34497 (RA:US)
Leukemia Viruses
Endogenous retrovirus and radiation-induced leukemia in the RMF mouse, 8:34572 (R:US)
Oncogenic Transformations
In vitro transformation of human mammary epithelial cells, 8:34621 (RA:US)
Phenotype
Extracellular matrix influences on gene expression: the role of matrix components in modulating the differentiated phenotype of mammary epithelial cells, 8:34498 (RA:US)
Radiobiology
Ideas on the unification of radiobiological theories, 8:34595 (RA:US)
Radiosensitivity
Wavelength dependence of inactivation and mutagenesis in a eucaryotic model system, 8:34579 (RA:DE)
Ultraviolet Radiation
Influence of induced recovery processes on the response of cells to UV radiation, 8:34580 (RA:DE)
ANIONS
Hydration
Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces, 8:34121 (J:US)
ANKYLOSING SPONDYLITIS
See SPONDYLITIS
ANL
Heavy Ion Accelerators
Argonne Tandem-Linac Accelerator System, 8:34307 (R:US)
ANTENNAS
Data Analysis
Comments on resolution of coherent sources incident on a circular antenna array, 8:34227 (J:US)
Dipoles
Performance of an array of vertical dipoles over an inhomogeneous ground system, 8:34250 (R:US)
Electric Grounds
Performance of an array of vertical dipoles over an inhomogeneous ground system, 8:34250 (R:US)
Performance
Performance of an array of vertical dipoles over an inhomogeneous ground system, 8:34250 (R:US)
Sommerfeld Integrals
Computer modeling of antennas near the ground, 8:34887 (J:US)
ANTHRACENE
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)
ANTHRAQUINONES
Chemical Composition
Compositional changes in red and violet smoke mixes after combustion, 8:34396 (R:US)
Combustion Products
Compositional changes in red and violet smoke mixes after combustion, 8:34396 (R:US)
ANTIMONY CHLORIDES
Electric Conductivity
Electrical conductivity of molten mixtures of antimony(III) chloride-aluminum chloride and antimony(III) chloride-aluminum chloride-sodium chloride, 8:34111 (J:US)
ANTIMONY FLUORIDES
Formation Heat
Enthalpies of formation of SbF_3(l) and Sb_2S_3(c) and the high-temperature thermodynamic functions of Sb_2S_3(c) and Sb_2S_3(l), 8:34137 (J:GB)
ANTIMONY SULFIDES
Formation Heat
Enthalpies of formation of SbF_3(l) and Sb_2S_3(c) and the high-temperature thermodynamic functions of Sb_2S_3(c) and Sb_2S_3(l), 8:34137 (J:GB)
Thermodynamic Properties
Enthalpies of formation of SbF_3(l) and Sb_2S_3(c) and the high-temperature thermodynamic functions of Sb_2S_3(c) and Sb_2S_3(l), 8:34137 (J:GB)
ANTIPROTONS
Pair Production
Two photon physics with the TASSO detector, 8:34749 (R:DE)
ANTRIM SHALES
See BLACK SHALES
APARTMENT BUILDINGS
Attached Greenhouses
Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J:US)
Energy Conservation
Comparative analysis of conservation and passive solar strategies in multi-family residences, 8:33445 (J:US)
Heat Pumps
Air/water heat pump in the block Brigaden, Linkoeping (Sweden), 8:33411 (R:SE:In Swedish)
Passive Solar Heating Systems
Comparative analysis of conservation and passive solar strategies in multi-family residences, 8:33445 (J:US)
Design implications and potentials of passive solar heating in higher density communities: the Lykovrissi Solar Village, 8:33512 (J:US)
Massachusetts Multi-Family Passive Solar Program: recent activities and findings, 8:33496 (J:US)
Passive solar in the city: 93 townhouses near Portland, Oregon, 8:33505 (J:US)
Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J:US)
Roosevelt Parkside: low income passive solar housing, 8:33480 (J:US)

Solar Air Conditioning
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R:US)
Solar Space Heating
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R:US)
Trombe Walls
Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J:US)
Weatherization
Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J:US)

APPALACHIA
The mountainous region, including valleys and plateaus extending through the eastern USA from New England to Georgia and Alabama.
Natural Gas Deposits
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R:US)
Petroleum Deposits
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R:US)

AQUATIC ECOSYSTEMS
Radiation Effects
Ocean disposal of radioactive wastes, 8:33236 (J:US)
Systems Analysis
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
Ultraviolet Radiation
Impact of enhanced solar UV-B radiation upon the marine ecosystem, 8:34661 (RA:DE)

AQUATIC ORGANISMS
Unspecified biota characteristic of aquatic ecosystems.
See also BENTHOS
CRUSTACEANS
FISHES
Photosynthesis
Photosynthetic carbon metabolism in the submerged aquatic angiosperm Scirpus subterminalis, 8:34510 (J:NL)

AQUEOUS HUMOR
See EYES

AQUEOUS SOLUTIONS
Vapor Pressure
Isopiestic studies of aqueous solutions at elevated temperatures. III. [(1-y)NaCl + $yCaCl_2$], 8:34139 (J:GB)

AQUIFERS
Contamination
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R:US)

ARCHITECTURE
Road map to the stars: teaching an integrated approach to energy conserving design, 8:33911 (J:US)

ARGON
Adsorption
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
Breakdown
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
Charged-Particle Transport
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
Electron Attachment
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
Electron Spin Resonance
Ab initio calculation of the structures and properties of some lithium-Lewis base complexes, 8:34126 (J:US)
Electron-Atom Collisions
Spin polarization effects in low-energy elastic electron scattering, 8:34723 (R:NL)
Ion-Atom Collisions
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Shock Waves
Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R:US)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Time-of-Flight Method
Effects of transient combustion phenomena on molecular-beam sampling, 8:34212 (R:US)

ARGON 40 BEAMS
RBE
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA:US)

ARGONNE NATIONAL LABORATORY
See ANL

ARIZONA
Geology
Geology, structure, and uranium deposits of the Marble Canyon 1° x 2° Quadrangle, Arizona, 8:33177 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Uranium Deposits
Geology, structure, and uranium deposits of the Marble Canyon 1° x 2° Quadrangle, Arizona, 8:33177 (R:US)

ARKANSAS
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)

AROMATIC ACIDS
See CARBOXYLIC ACIDS

AROMATIC COMPOUNDS
See AROMATICS

AROMATICS
See also ANILINE
BENZENE
CONDENSED AROMATICS
HALOGENATED AROMATIC HYDROCARBONS
PHENOLS
POLYCYCLIC AROMATIC HYDROCARBONS
STYRENE
Gas Chromatography
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
Infrared Spectra
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
Mass Spectra
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
Nitration
Modelling and scaleup of dispersed phase liquid-liquid reactors, 8:34160 (J:GB)
Nuclear Magnetic Resonance
^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond, 8:34158 (J:GB)

Spin-Lattice Relaxation
^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond, 8:34158 (J:GB)
ARSENIC
Health Hazards
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
ASBESTOS
Optical Microscopy
Quantitative determination of chrysotile in building materials, 8:34072 (J:GB)
Transmission Electron Microscopy
Quantitative determination of chrysotile in building materials, 8:34072 (J:GB)
X-Ray Diffraction
Quantitative determination of chrysotile in building materials, 8:34072 (J:GB)
ASHES
See also FLY ASH
Chemical Analysis
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Melting Points
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Waste Disposal
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
ASTHMA
Epidemiology
Effects of air pollution on airway function. Final report May 80-May 81, 8:34631 (R:US)
ASTRONOMY
Research Programs
Pacific Northwest Laboratory operated by Battelle Memorial Institute for the Department of Energy, 8:34694 (J:US)
ASTROPHYSICS
Meetings
Mass loss from astronomical objects. RAL workshop on astronomy and astrophysics, 8:34692 (R:GB)
Nuclear Reactions
Applied uses of nuclear level densities, 8:34824 (R:US)
ATMOSPHERIC PRECIPITATIONS
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)
ATOMIC ABSORPTION SPECTROSCOPY
See ABSORPTION SPECTROSCOPY
ATOMIC ENERGY
See NUCLEAR ENERGY
ATOMIC PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text books, etc.
Ion Beams
Atomic needs for ion beams, 8:34305 (RA:US)
ATOMIC SHELLS
See ELECTRONIC STRUCTURE
ATOMIC SHELLS (K)
See K SHELL
ATOMS
See also ISOELECTRONIC ATOMS
Quadrupole Moments
Quadrupole polarizability of atoms and ions, 8:34725 (RA:SU:In Russian)
ATTACHED GREENHOUSES
Computerized Simulation
Analysis of an attached greenhouse in a low insolation northern climate, 8:33448 (J:US)
Parametric sunspace/rockbed studies using CALPAS3, 8:33426 (J:US)
Gardening
Food and fuel: round two (Comparison of input/output ratios for attached greenhouse vs commercial acreage), 8:33521 (J:US)
Humidity
Humidity fluctuations in solar greenhouse-residences, 8:33477 (J:US)
Parametric Analysis
Parametric sunspace/rockbed studies using CALPAS3, 8:33426 (J:US)
Performance
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Performance Testing
Results of a retrofit sunspace testing program, 8:33526 (J:US)
Retrofitting
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J:US)
Solar Collectors
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J:US)
Surveys
Sunspaces in th rain belt, 8:33475 (J:US)
Technology Transfer
NCAT National Greenhouse Grant Program: a model for technology transfer, 8:33522 (J:US)
Thermal Analysis
Analysis of an attached greenhouse in a low insolation northern climate, 8:33448 (J:US)
Thermal Comfort
Humidity fluctuations in solar greenhouse-residences, 8:33477 (J:US)
Training
Texas solar greenhouse '80 statewide program, 8:33487 (J:US)
AUSTENITIC STEELS
Prior to February, 1978 STEELS and AUSTENITE were used to index this concept.
Corrosion
Testing of OTEC riser cable components and models, 8:33368 (RA:US)
Cracking
Influence of metallurgical variables on hydrogen assisted cracking of austenitic stainless steels, 8:33961 (RA:IL)
Crystal Structure
The metallurgical structure and mechanical properties at low temperature of Nitronic 40 with particular reference to its use in the construction of models for cryogenic wind tunnels, 8:33997 (R:US)
Mechanical Properties
The metallurgical structure and mechanical properties at low temperature of Nitronic 40 with particular reference to its use in the construction of models for cryogenic wind tunnels, 8:33997 (R:US)
AUSTRALIA
Nuclear Industry
Potential for an Australian uranium industry, 8:33817 (R:AU)
AUSTRIA
Petroleum Industry
Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs, 8:33148 (R:AT:In German)
AUTOMOTIVE FUELS
Antiknock Ratings
Determination of a knock criterion of the Otto-engine combustion and precalculation of the knock limit, 8:33950 (R:DE:In German)
Fuel Substitution
Alternative motor fuels. A survey of the government R and D efforts, 8:33952 (R:SE:In Swedish)
Research Programs
Alternative motor fuels. A survey of the government R and D efforts, 8:33952 (R:SE:In Swedish)

AVR REACTOR
Operation
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
Planning
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
AWAY-FROM-REACTOR STORAGE
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R:US)
AZIMUTH
Calculation Methods
Fine tuning solar access: calculators and computers as design tools, 8:33471 (J:US)
AZULENE
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)

B

BACILLUS
See also BACILLUS SUBTILIS
Growth
Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery (Bacillus stearothermophilus), 8:33118 (RA:US)
Morphology
Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery (Bacillus stearothermophilus), 8:33118 (RA:US)
BACILLUS SUBTILIS
Ultraviolet Radiation
Role of DNA breakage in bacterial lethality caused by UV-B radiation, 8:34584 (RA:DE)
BACKFILLING
Materials Testing
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
BACKGROUND NOISE
Maximum-Likelihood Fit
Statistically optimal evaluation of decay constant using the data of measurements with low background noise, 8:34539 (RA:SU:In Russian)
BACON
See MEAT
BACTERIA
See also BACILLUS
CLOSTRIDIUM
ESCHERICHIA COLI
METHANOGENIC BACTERIA
PSEUDOMONAS
Adhesion
Adherence of bacteria to hydrocarbons, 8:33106 (RA:US)
Cell Cultures
Growth and biosurfactant production of a bacteria in continuous culture (Bacterial strain Rsan ver (Pseudomonas sp.)), 8:33105 (RA:US)
Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry (Brevibacterium viscogenes), 8:33107 (RA:US)
Microbial interactions with polyacrylamide polymers (Desulfovibrio desulfuricans), 8:33120 (RA:US)
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Environmental Transport
Investigation of the transport of bacteria through porous media, 8:33110 (RA:US)
Growth
Barobiology of deep oil formations (Bacillus licheniformis and streptococcus faecalis), 8:33119 (RA:US)
Microbial processes in the recovery of heavy petroleum, 8:33115 (RA:US)
Microbial interactions with polyacrylamide polymers (Desulfovibrio desulfuricans), 8:33120 (RA:US)
Some constraints on the use of bacteria in enhanced oil recovery, 8:33125 (RA:US)
Infectivity
Measure of Legionella penumophila activity in situ, 8:34561 (J:US)
Metabolism
Adherence of bacteria to hydrocarbons, 8:33106 (RA:US)
Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA:US)
Screening
Potential for use of microbes in the production of heavy oil, 8:33114 (RA:US)
Separation Processes
Pilot microscreen separation of Sclerotium rolfsii biomass and broth (Sclerotium rolfsii), 8:33136 (J:US)
Uses
Biosurfactants and enhanced oil recovery (Cornebacterium lepus), 8:33117 (RA:US)
BACTERIAL DISEASES
Pathology
Measure of Legionella penumophila activity in situ, 8:34561 (J:US)
BACTERIOPHAGES
Biological Repair
Identification and partial purification of the error-prone repair gene products of bacteriophage T4, 8:34559 (RA:US)
BANKS
See COMMERCIAL BUILDINGS
BARIUM
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
BARIUM 138 TARGET
Neutron Reactions
Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J:US)
BARLEY
Ultraviolet Radiation
Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA:DE)
Effect of enhanced UV-B radiation on photosynthetic activity of barley seedlings and chloroplasts, 8:34583 (RA:DE)
BARSTOW SOLAR PILOT PLANT
10-MW solar central receiver pilot plant at Barstow, California.
Central Receivers
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
BARTLESVILLE ENERGY TECHNOLOGY CENTER
Research Programs
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
BARYON NUMBER
Symmetry Breaking
B-L violating supersymmetric couplings, 8:34765 (R:US)
BASALT
Deformation
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
Dynamic Loads
Velocities and dynamic moduli of five EE2 borehold samples: technical summary report, 8:33575 (RA:US)

Isotope Dating
Empirically determined uncertainty in potassium-argon ages for Plio-Pleistocene basalts from Crater Flat, Nye County, Nevada, 8:34669 (R:US)
Thermal Stresses
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
Waste-Rock Interactions
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
BATTELLE PACIFIC NORTHWEST LABORATORIES
Research Programs
Pacific Northwest Laboratory operated by Battelle Memorial Institute for the Department of Energy, 8:34694 (J:US)
BATTERIES (ELECTRIC)
See ELECTRIC BATTERIES
BATTERIES (ISOTOPIC)
See RADIOISOTOPE BATTERIES
BEAM BENDING MAGNETS
Magnet Pole Pieces
Dual-aperature dipole with 2nd harmonic, 8:34308 (R:US)
Power Supplies
Dual-frequency ring-magnet power supply with flat bottom, 8:34306 (R:US)
BEAM BUNCHERS
Performance
Rehovot 14UD Pelletron: status report, 8:34331 (BA:US)
BEAM FOCUSING MAGNETS
Permanent Magnets
Permanent multipole magnets with adjustable strength, 8:34292 (R:US)
Pulse Generators
Pulsed power supply system for the fast quadrupoles in the AGS, 8:34299 (R:US)
Quadrupoles
Pulsed power supply system for the fast quadrupoles in the AGS, 8:34299 (R:US)
BEAM INJECTION HEATING
Neutral Atom Beam Injection
Negative ion formation and neutralization processes, (1). Related to plasma heating by 'negative ion based neutral beam injection', 8:34899 (R:JP:In Japanese)
BEAM MONITORS
Coupling
Slotted coax as a beam electrode, 8:34316 (R:US)
BEAM STRIPPERS
Carbon
Carbon foil behavior with I beams, 8:34340 (BA:US)
Comparative performance of stripper foils in the Argonne FN tandem, 8:34339 (BA:US)
Fabrication
Physical properties and structure of carbon foils made by the dc glow discharge process, 8:34337 (BA:US)
Foils
Carbon foil behavior with I beams, 8:34340 (BA:US)
Differences of amorphous and graphitized carbon foils in their stripper qualities, 8:34338 (BA:US)
Physical properties and structure of carbon foils made by the dc glow discharge process, 8:34337 (BA:US)
Performance
Carbon foil behavior with I beams, 8:34340 (BA:US)
Comparative performance of stripper foils in the Argonne FN tandem, 8:34339 (BA:US)
Transmission
Differences of amorphous and graphitized carbon foils in their stripper qualities, 8:34338 (BA:US)
BEAN PLANT
See PHASEOLUS
BEANS
Biological Radiation Effects
Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA:DE)
Ultraviolet Radiation
Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA:DE)
BEEF
See MEAT
BEHAVIOR
Limited to living systems.
Pathological Changes
Effects of inorganic lead on behavioral and neurologic function. Final report, 8:34635 (R:US)
BELLOWS
Cracks
Analysis of circumferential cracking in hydroformed bellows, 8:34215 (R:US)
Stress Analysis
Analysis of circumferential cracking in hydroformed bellows, 8:34215 (R:US)
BENTHOS
Metabolism
Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling, 8:34509 (J:US)
Population Dynamics
Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling, 8:34509 (J:US)
BENZANTHRACENE
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)
BENZENE
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Catalytic Cracking
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R:US)
Removal
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R:US)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
BENZOIC ACID
Ionization
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
Isomerization
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Radiolysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Structural Chemical Analysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Ultraviolet Spectra
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
BENZOPYRENE
Biological Effects
Benzo(a)pyrene metabolism in human mammary epithelial cells, 8:34622 (RA:US)
In vitro transformation of human mammary epithelial cells, 8:34621 (RA:US)

Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)
Metabolism
Benzo(a)pyrene metabolism in human mammary epithelial cells, 8:34622 (RA:US)
Species variance in the metabolic activation of polycyclic hydrocarbons, 8:34642 (J:US)
BERING SEA
Resource Development
Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83, 8:33156 (R:US)
BERKELEY BEVALAC
See BEVALAC
BERMS
See EARTH BERMS
BERYLLIUM
Binding Energy
Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics, 8:34124 (J:NL)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
BERYLLIUM 9 REACTIONS
Oxygen 18 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
Transfer Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
BERYLLIUM 9 TARGET
Neutron Reactions
Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV, 8:34803 (J:US)
BERYLLIUM ALLOYS
Phase Transformations
Study of Cu-Be alloys in the vicinity of the eutectoid composition, 8:33999 (TG:US)
BERYLLIUM IONS
Ion-Atom Collisions
Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy, 8:34726 (R:JP)
BERYLLIUM MODERATORS
See BERYLLIUM
BETA BEAMS (ELECTRONS)
See ELECTRON BEAMS
BETA PARTICLES
Emitted by nuclei.
Radioecological Concentration
Atmospheric monitoring, 8:34418 (RA:US)
BEVALAC
Evaluation
Treatment of cancer with heavy charged particles, 8:34548 (RA:US)
BEVERAGE INDUSTRY
Energy Conservation
Stress reduction at the production of bottle-cap screws, 8:33930 (R:DE:In German)
BIBLIS-3 REACTOR
Hearings
Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R:DE:In German)
Reactor Licensing
Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R:DE:In German)
BIBLIS-C REACTOR
See BIBLIS-3 REACTOR
BIOGAS PROCESS
Technology Transfer
Biogas in China 1981 - a travel report, 8:33327 (R:SE:In Swedish)
BIOLOGICAL MATERIALS
Chemical Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Multi-Element Analysis
Sensitivity calculations for multielemental trace analysis by synchrotron radiation induced X-ray fluorescence, 8:34061 (J:NL)
BIOLOGICAL RADIATION EFFECTS
See also RADIATION INJURIES
Mathematical Models
Critical review of the reactor-safety study radiological health effects model. Final report, 8:33766 (R:US)
Ideas on the unification of radiobiological theories, 8:34595 (RA:US)
Molecular Biology
Study of the molecular basis for radiation mutagenesis. Final progress report, 8:34574 (R:US)
Research Programs
REP Annual Report 1981 (Leading abstract), 8:34586 (R:NL)
BIOLOGICAL REACTORS
See BIOREACTORS
BIOLOGICAL REPAIR
Molecular Biology
uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells, 8:34494 (R:US)
BIOLOGICAL SHIELDS
Group Constants
Analysis of sensitivity to the group constant variations in biological shield calculations by the extraction-diffusion method, 8:33733 (RA:SU:In Russian)
BIOMASS
Policy issues in Ethiopian energy development, 8:33320 (R:SE)
Combustion
Joint IEA/IUFRO forestry energy workshop, 8:33338 (R:SE)
Cost
Drying of fuel chips with solar panel warmed air, 8:33346 (R:SE:In Swedish)
Energy Conversion
Energy provision for the Seychelles. Producer gas and other opportunities, 8:33877 (R:SE)
Energy Source Development
Report on biomass energy, 8:33322 (R:US)
Gasification
Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane., 8:33351 (R:SE)
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)
Thermal cracking of tars and hydrocarbons by adding oxygen and steam, 8:33331 (R:SE:In Swedish)
Harvesting Equipment
Technical equipment for the cultivation of energy forest, 8:33328 (R:SE:In Swedish)
Meetings
Harvesting and utilization of wood for energy purposes, 8:33339 (R:SE)
Net Energy
Report on biomass energy, 8:33322 (R:US)
Production
Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report, 8:33308 (R:US)
Research Programs
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
Evalution of the research project 'Forest Energy', 8:33876 (R:SE)
Summary biomass research conference: Southeastern region, 8:33874 (R:US)
Short Rotation Cultivation
Technical equipment for the cultivation of energy forest, 8:33328 (R:SE:In Swedish)
Storage
Importance of cover and air under-base with storage of fuel chip chips, 8:33347 (R:SE:In Swedish)

Technology Assessment
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R:DE:In German)

BIOMASS PLANTATIONS
Grass
Energy Reeds. Part 4., 8:33337 (R:SE:In Swedish)
Harvesting
Energy Reeds. Part 4., 8:33337 (R:SE:In Swedish)
Insects
Insect damage to fast growing Salix and Populus species, 8:33333 (R:SE:In Swedish)

BIOREACTORS
Prior to March 1983 this concept was indexed to CHEMICAL REACTORS.
Kinetics
Phenol degradation in a three-phase fluidized-bed bioreactor, 8:33058 (R:US)
Operation
Phenol degradation in a three-phase fluidized-bed bioreactor, 8:33058 (R:US)

BIPYRIDINES
Radiolysis
Resonance Raman of viologen radicals, 8:34199 (J:NL)
Scavenging
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J:NL)

BIS(2-ETHYLHEXYL)PHOSPHORIC ACID
See HDEHP

BLACK COAL
Comminution
Determination of expected breakage of raw coal muck by simulated operational stress with special regard to raw-material influence parameters, 8:33082 (R:DE:In German)

BLACK SHALES
Fractures
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Resource Assessment
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)
Sampling
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)
Well Logging
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)

BLADDER
Neoplasms
Treatment of bladder cancer. Oncology overview, 8:34553 (R:US)

BLADES (TURBINES)
See TURBINE BLADES

BLANKETS (BREEDING)
See BREEDING BLANKETS

BLAST FURNACES
Heat Recovery
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R:SE:In Swedish)
Off-Gas Systems
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R:SE:In Swedish)

BLASTS
See EXPLOSIONS

BLENDING
See MIXING

BLOOD CIRCULATION
Mathematical Models
Perfusion measurements with radioactively labelled microspheres. Technique and computer-based evaluation, 8:34527 (R:DE:In German)

BLOOD PLATELETS
Cell Proliferation
Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA:US)
Kinetics
Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA:US)

BLOWOUTS
Hydrodynamics
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)
Two-Phase Flow
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)

BNL
Tandem Electrostatic Accelerators
Recent upgrading of the Brookhaven double MP facility and plans for the future, 8:34303 (R:US)

BODY TEMPERATURE
Daily Variations
Biological effects of magnetic fields, 8:34664 (RA:US)

BOILER FUEL
See BOILER FUELS

BOILER FUELS
Comparative Evaluations
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)

BOILERS
Corrosion
Corrosion of carbon steel in substoichiometric combustion gases, 8:34257 (BA:US)
Flue Gas
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan, 8:33035 (RA:US)
Heat Transfer
Convective and radiative heat transfer in MHD radiant boilers, 8:33880 (J:US)
Off-Gas Systems
Bal 2 process, 8:33088 (R:SE:In Swedish)
Tubes
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)

BOILING WATER COOLED AND MODERATED REACTO
See BWR TYPE REACTORS

BOLIVIA
Energy Policy
Energy industry of Bolivia 1981, 8:33788 (R:DE:In German)
Energy Supplies
Energy industry of Bolivia 1981, 8:33788 (R:DE:In German)

BONE JOINTS
Scintiscanning
Scintigraphic evaluation of the sacroiliac joints in anklylosing spondylitis, 8:34523 (R:DE:In German)

BONE MARROW
Transfusions
Marrow transfusions into normal recipients, 8:34478 (RA:US)

BONES
See SKELETON

BONNER SPHERE DETECTORS
Efficiency
Monte Carlo calculation of energy dependence for efficiency of moderating neutron detectors, 8:34365 (RA:CS:In Slovak)
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)

BOOSTERS (PARTICLE)
See PARTICLE BOOSTERS

BOREHOLES
Compressibility
Rough-crack model for pore compressibility: application to data for crack compliance around a borehole (Summary and data for paper in progress), 8:33572 (RA:US)
Cracks
Rough-crack model for pore compressibility: application to data for crack compliance around a borehole (Summary and data for paper in progress), 8:33572 (RA:US)

Well Logging
Relation of well-log velocities and magnetic susceptibilities to laboratory value: Conway granites, White Mountains, New Hampshire, 8:33555 (RA:US)

BORON
Adsorption
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)

BORON 10 TARGET
Deuteron Reactions
Utilization of the reaction $^{10}B(d,n)\ ^{11}C$ as a high temperature deuterium plasma diagnostic, 8:34804 (J:US)
Neutron Reactions
Measurement of the $^{10}B/^{6}Li$ cross section ratio below 1 keV, 8:34802 (J:US)

BORON IONS
Electron Attachment
Dielectronic recombination: recent results from ORNL, 8:34719 (RA:US)
Electron-Ion Collisions
Dielectronic recombination: recent results from ORNL, 8:34719 (RA:US)

BOROSILICATE GLASS
Leaching
Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass, 8:33238 (J:US)
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)

BOROSILICATES
See BOROSILICATE GLASS

BRACKISH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS

BRAIN
Computerized Tomography
Study of cerebral metastases by means of computerized tomography, 8:34535 (R:DE:In German)
Positron Computed Tomography
New blood flow radiopharmaceutical, 8:34545 (RA:US)
Positron imaging studies in Alzheimer-type dementia, 8:34543 (RA:US)
Scintiscanning
Negative brain scintigrams in brain tumors, 8:34518 (R:DE:In German)
Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths, 8:34522 (R:DE:In German)

BRAZIL
Away-From-Reactor Storage
Considerations on the management of wastes expected to be generated by the operation of Brazilian nuclear reactors, 8:33215 (RA:BR:In Portuguese)
Economic Development
Energy-development correlation and the nuclear strategy in Brazil. Part 1, 8:33796 (RA:BR:In Portuguese)
Energy Analysis
Energy-development correlation and the nuclear strategy in Brazil. Part 1, 8:33796 (RA:BR:In Portuguese)
Energy Policy
Brazil - energy situation 1981, 8:33832 (R:DE:In German)
National Energy Balance: recent evolution and perspectives, 8:33846 (RA:BR:In Portuguese)
Energy Supplies
Brazil - energy situation 1981, 8:33832 (R:DE:In German)
Environmental Policy
Nuclear energy - the Brazilian rules for the environment protection, 8:34421 (B:BR:In Portuguese)
Insurance
Development trends of nuclear risk insurance in Brazil, 8:33778 (B:BR:In Portuguese)
Nuclear Energy
Development trends of nuclear risk insurance in Brazil, 8:33778 (B:BR:In Portuguese)
Energy-development correlation and the nuclear strategy in Brazil. Part 2, 8:33814 (RA:BR:In Portuguese)
Nuclear energy - the Brazilian rules for the environment protection, 8:34421 (B:BR:In Portuguese)
Nuclear Materials Management
Physical protection of nuclear-facilities and materials, 8:33257 (B:BR:In Portuguese)
Radioactive Waste Management
Considerations on the management of wastes expected to be generated by the operation of Brazilian nuclear reactors, 8:33215 (RA:BR:In Portuguese)
Reactor Accidents
Aspects of the Brazilian law on civil liability for nuclear damage, 8:33777 (B:BR:In Portuguese)
Reactor Licensing
Legal bases for the installation of nuclear power plants, 8:33700 (B:BR:In Portuguese)
Uranium Ores
Legal aspects of search and mining of nuclear ores under Brazilian law, 8:33850 (B:BR:In Portuguese)

BRAZILIAN CNEN
Comissao Nacional de Energia Nuclear de Brasil.
Energy Policy
Evolution and present situation of nuclear energy legislation in Brazil, 8:33820 (B:BR:In Portuguese)
Environmental Policy
Nuclear energy and the rules of environment protection, 8:33845 (RA:BR:In Portuguese)

BREAKDOWN
Limited to electric discharge phenomena. See also CLEAVAGE or DECOMPOSITION.
Frequency Dependence
Air insulation behaviour under oscillating impulses, 8:33631 (RA:US)
Mathematical Models
Analytic formulation of electron distribution function from transport coefficients of electron swarm, 8:34701 (RA:US)

BREAKERS (CIRCUIT)
See CIRCUIT BREAKERS

BREASTS
See MAMMARY GLANDS

BREEDING BLANKETS
Breeding Ratio
Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R:US)
Design
Fusion-breeder-reactor design studies, 8:34949 (R:US)
Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket, 8:34917 (R:US)
Hydraulics
Mechanical design and thermal hydraulic considerations for self-cooled lithium-lead blanket, 8:34917 (R:US)
Radiation Heating
Gamma-ray heating in the Fast Breeder Blanket Facility, 8:33690 (J:US)
Reviews
Overview of first wall/blanket/shield technology, 8:34915 (R:US)

BRINES
Diffusion
Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R:US)
Solvent Properties
Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C, 8:33577 (R:US)
Waste Disposal
Strategic Petroleum Reserve and brine-disposal problem, 8:33157 (R:US)

BROMINATED ALIPHATIC HYDROCARBONS
Metabolic Activation
Effect of metabolic activation on the cytotoxicity and mutagenicity of 1,2-dibromoethane in the CHO/HGPRT system, 8:34639 (J:NL)
Toxicity
Effect of metabolic activation on the cytotoxicity and mutagenicity of 1,2-dibromoethane in the CHO/HGPRT system, 8:34639 (J:NL)
BROMINE
Radiolysis
Evidence for the Br_3^- reaction with Ni(III) macrocyclic complexes: Br_2^- as a possible reducing agent, 8:34197 (J:CH)
BROMINE 79 TARGET
Neutron Reactions
Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV, 8:34820 (J:US)
BROMINE 81 TARGET
Neutron Reactions
Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV, 8:34820 (J:US)
BROMINE BROMIDES
See BROMINE
BROMINE ISOTOPES
Neutron Reactions
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
BRONCHOGENIC CARCINOMA
See CARCINOMAS
BROOKHAVEN AGS
Accelerator Facilities
Plans for Brookhaven fastbus during the next $\pi \times 10^{16}$ nanoseconds, 8:34322 (J:US)
Beam Focusing Magnets
Pulsed power supply system for the fast quadrupoles in the AGS, 8:34299 (R:US)
BROOKHAVEN INTERSECTING STORAGE ACCELERAT
See ISABELLE STORAGE RINGS
BROOKHAVEN NATIONAL LABORATORY
See BNL
BSF REACTOR
See BSR-1 REACTOR
BSR-1 REACTOR
Reactor Operation
Bulk Shielding Facility quarterly report October, November, and December 1982, 8:33734 (R:US)
BSR-2 REACTOR
Reactor Operation
Bulk Shielding Facility quarterly report October, November, and December 1982, 8:33734 (R:US)
BUBBLES
Trajectories
Dynamics of bubbles and entrained particles in the rotating fluidized bed, 8:34239 (J:US)
BUDAPEST TRAINING REACTOR
Biological Shields
Analysis of sensitivity to the group constant variations in biological shield calculations by the extraction-diffusion method, 8:33733 (RA:SU:In Russian)
BUILDING MATERIALS
See also CEMENTS
CONCRETES
Bibliographies
Buildings energy research: a bibliography. Publications of the Building Systems Division, 8:33901 (R:US)
Chemical Analysis
Quantitative determination of chrysotile in building materials, 8:34072 (J:GB)
Meetings
Radioactivity of different building materials. Proceedings of the 7. annual meeting of the OeSRAD held in Vienna, Austria, May 1981, 8:34425 (R:AT:GE)
Natural Radioactivity
Radioactivity of different building materials. Proceedings of the 7. annual meeting of the OeSRAD held in Vienna, Austria, May 1981, 8:34425 (R:AT:GE)
Radiation Monitoring
Radon release from building material, 8:34416 (R:SE)
Regulations
Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2, 8:33899 (R:AT:In German)
Soils
Rammed earth construction: a re-emerging technology, 8:33917 (J:US)
Thermal Conductivity
Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2, 8:33899 (R:AT:In German)
BUILDINGS
See also COMMERCIAL BUILDINGS
DOUBLE ENVELOPE BUILDINGS
EARTH-COVERED BUILDINGS
GREENHOUSES
LABORATORY BUILDINGS
OFFICE BUILDINGS
PUBLIC BUILDINGS
RESIDENTIAL BUILDINGS
SCHOOL BUILDINGS
Bibliographies
Buildings energy research: a bibliography. Publications of the Building Systems Division, 8:33901 (R:US)
Climates
Design methodology based on climate characteristics, 8:33467 (J:US)
Computer-Aided Design
Simulation programs as design tools: an optimization technique, 8:33453 (J:US)
Data Acquisition Systems
Design of a moderate-cost microcomputer data acquisition system for experimental investigations of thermal systems, 8:33907 (J:US)
Daylighting
Big buildings and passive solar energy, 8:33485 (J:US)
Design
Design methodology based on climate characteristics, 8:33467 (J:US)
Road map to the stars: teaching an integrated approach to energy conserving design, 8:33911 (J:US)
Energy Conservation
Buildings energy research: a bibliography. Publications of the Building Systems Division, 8:33901 (R:US)
Road map to the stars: teaching an integrated approach to energy conserving design, 8:33911 (J:US)
Passive Solar Cooling Systems
Cooling effect of night ventilation, 8:33535 (J:US)
Detached earth cooling with radiant interior building elements, 8:33534 (J:US)
Passive Solar Heating Systems
Big buildings and passive solar energy, 8:33485 (J:US)
Heat storage and distribution inside passive-solar buildings, 8:33407 (R:US)
Radiation Monitoring
Radon release from building material, 8:34416 (R:SE)
Sensible Heat Storage
Heat storage and distribution inside passive-solar buildings, 8:33407 (R:US)
Thermal Comfort
Perception of thermal comfort, 8:33473 (J:US)
Ventilation
Cooling effect of night ventilation, 8:33535 (J:US)
Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R:US)
BULK SHIELDING REACTOR-1
See BSR-1 REACTOR
BULK SHIELDING REACTOR-2
See BSR-2 REACTOR
BUMP-IN-TAIL INSTABILITY
Numerical Solution
Numerical simulation of echo phenomena in plasma, 8:34895 (R:DE:In German)

BUNDLES (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS
BURNER FUEL OIL
See HEATING OILS
BUTANE
Dielectric Properties
High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane, 8:34025 (RA:US)
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Radiolysis
ESR spectra and structure of the n-butane and n-hexane radical cations, 8:34198 (J:NL)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
BUTENES
Dehydrogenation
Effect of additives to iron oxide in the selective oxidative dehydrogenation reactions, 8:33140 (J:US)
BUTYLENES
See BUTENES
BWR TYPE REACTORS
See also DRESDEN-2 REACTOR
DRESDEN-3 REACTOR
LINGEN REACTOR
QUAD CITIES-1 REACTOR
QUAD CITIES-2 REACTOR
RWE-BAYERNWERK REACTOR
WNP-2 REACTOR
WUERGASSEN REACTOR
Containment Shells
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
Containment Systems
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)
Risk assessment of filtered-vented containment options for a BWR Mark I containment, 8:33774 (BA:US)
Control Rooms
Near-term improvements for nuclear power plant control room annunciator systems, 8:33730 (R:US)
Fuel Element Clusters
Freon Rig design for performing heat transfer experiments for nuclear reactors fuel bundles, 8:33670 (RA:BR:In Portuguese)
Legal Aspects
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Loss of Coolant
BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R:US)
Meltdown
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)
Plutonium Recycle
Improvement of reactor physics design methods for plutonium recycling in boiling water reactors (BPSPU code), 8:33663 (R:DE:In German)
Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R:DE:In German)
Power Supplies
Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R:US)
Reactor Accidents
Hydrodynamics of adiabatic inverted annular flow: an experimental study, 8:33738 (R:US)
Nuclear reactor safety in the USA, 8:33749 (R:US)
Reactor Materials
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Reactor Safety
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Nuclear reactor safety in the USA, 8:33749 (R:US)
Nuclear reactor safety. Progress report, July 1-October 31, 1982 (Los Alamos National Laboratory), 8:33759 (R:US)
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R:US)
Risk Assessment
Nuclear reactor safety in the USA, 8:33749 (R:US)

C

CABLES (ELECTRIC)
See ELECTRIC CABLES
CADMIUM
Biological Effects
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Sensitivity
Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants, 8:34617 (R:US)
CADMIUM 106 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, ^{106,114}Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
CADMIUM 113 TARGET
Neutron Reactions
Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei, 8:34796 (J:US)
CADMIUM 114 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, ^{106,114}Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
CADMIUM ARSENIDES
Phase Studies
Phase stability and microstructural characteristics of bulk glassy CdGe/sub 1-x/Si/sub x/As_8 alloys, 8:34047 (J:GB)
CADMIUM SULFIDE SOLAR CELLS
Production
New methods for preparing Cu_2S-CdS solar cell semiconductor materials. Final report, 8:33324 (R:XE:FR)
CADMIUM TELLURIDE SOLAR CELLS
Production
Polycrystalline CdTe thin-film solar cells. Production by triode sputtering and short-distance transmission. Final report, 8:33325 (R:XE:In French and English)
CALCIUM
Activation Analysis
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R:US)
Binding Energy
Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics, 8:34124 (J:NL)

Distribution Functions
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
Oxygen 16 Reactions
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R:US)
Solvent Extraction
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
Tissue Distribution
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R:US)

CALCIUM 40 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)

CALCIUM ALLOYS
Sorptive Properties
Project "usage of hydrogen for purposes of energy technology", 8:33263 (R:AT:In German)

CALCIUM CHLORIDES
Vapor Pressure
Isopiestic studies of aqueous solutions at elevated temperatures. III. [(1-y)NaCl + yCaCl$_2$], 8:34139 (J:GB)

CALCIUM ISOTOPES
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)

CALCULATORS
Programming
Programmable calculator stress analysis, 8:34213 (R:US)

CALIFORNIA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Magnetotelluric Surveys
Audio-magnetotelluric data log and station location map for the Glamis Known Geothermal Resource Area, California, 8:33558 (R:US)
Audio-magnetotelluric data log and station location map for the Saline Valley Known Geothermal Resource Area, California, 8:33559 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Telluric Surveys
Telluric profile location map and telluric data for the Glamis Known Geothermal Resource Area, California, 8:33560 (R:US)

CALIFORNIUM
Crystal Structure
X-ray-diffraction study of californium metal to 16 GPa, 8:33958 (R:US)

CALIFORNIUM 252
Spontaneous Fission
Parasitic absorption and leakage corrections for $MnSO_4$ baths, 8:34383 (J:US)
Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei, 8:34796 (J:US)

CALORIMETERS (PARTICLE)
See SHOWER COUNTERS

CAMP
See AMP

CANADA
Meteorology
Merged solar and meteorological data base for solar energy use, 8:33282 (J:US)

CANCER
See NEOPLASMS

CANDU TYPE REACTORS
Pressure Tubes
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)

CANONICAL QUANTUM FIELD THEORY
See LAGRANGIAN FIELD THEORY

CARBANIONS
Photolysis
Carbanion photooxidation at semiconductor surfaces, 8:34167 (J:US)

CARBENES
Chemical Reaction Kinetics
Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes, 8:34107 (J:NL)

CARBINOL
See METHANOL

CARBON
See also ACTIVATED CARBON
GRAPHITE
Chemical Reactions
Velocity-selected molecular beam study of rotational excitation in the reaction C + NO → CN + O, 8:34122 (J:NL)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
Neutron Reactions
Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV, 8:34801 (J:US)
Oscillator Strengths
Rules for S(-2k) dipole sums, 8:34733 (J:DE)
Oxidation
Reclamation and disposal of water-based machining coolants, 8:34451 (RA:US)

CARBON 12
Isotope Ratio
Global carbon cycle program, 8:34401 (RA:US)

CARBON 12 BEAMS
RBE
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA:US)

CARBON 12 TARGET
Neutron Reactions
^{12}C + n polarization measurements and the carbon standard, 8:34805 (J:US)

CARBON 13
Isotope Effects
^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond, 8:34158 (J:GB)
Isotope Ratio
Global carbon cycle program, 8:34401 (RA:US)
Nuclear Magnetic Resonance
Asymmetric NMR spectra of weakly coupled nuclei: a common characteristic in the ^{13}C NMR spectra of [U-^{13}C] labeled molecules and in natural abundance proton-coupled ^{13}C spectra, 8:34157 (J:GB)

CARBON 13 TARGET
Oxygen 18 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)

CARBON COMPOUNDS
See also CARBON FLUORIDES
Quantitative Chemical Analysis
Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA:US)

CARBON CYCLE
Global Aspects
Global carbon cycle program, 8:34401 (RA:US)
Mathematical Models
Global carbon cycle program, 8:34401 (RA:US)
Research Programs
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)

CARBON DIOXIDE
Absorption
Saturation of hot CO_2 by short 10.6 μm laser pulses, 8:34856 (J:US)

Adsorption
Chemical properties of anion vacancies on zinc oxide, 8:34006 (J:NL)
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Raman Spectra
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R:US)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Toxicity
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)
Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82, 8:34666 (R:US)

CARBON FLUORIDES
Breakdown
Homogeneous field breakdown strength characteristics of some dielectric gases, 8:34026 (RA:US)
Sparking potentials calculated from the electron-molecule collision properties of gases, 8:34705 (RA:US)
Dielectric Properties
High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane, 8:34025 (RA:US)
Photoemission
Spectroscopic study of low pressure fluorine-containing gas discharge, 8:34706 (RA:US)

CARBON IONS
Electron Attachment
Dielectronic recombination: recent results from ORNL, 8:34719 (RA:US)
Electron-Ion Collisions
Dielectronic recombination: recent results from ORNL, 8:34719 (RA:US)

CARBON ISOTOPES
See also CARBON 12
CARBON 13
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)

CARBON MONOXIDE
Adsorption
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Chemical Reactions
Water gas shift reaction. II, 8:33272 (J:IN)
Water gas shift reaction. I, 8:33273 (J:IN)
Chemisorption
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Dielectric Properties
High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane, 8:34025 (RA:US)
Diffusion
CO diffusion capacity, 8:34623 (R:DE:In German)
Dissociation
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Health Hazards
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Raman Spectra
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R:US)
Respiration
CO diffusion capacity, 8:34623 (R:DE:In German)

CARBON STEELS
See also STEEL-ASTM-A333-B
Charpy Test
Medium carbon steel alloy design for wear applications, 8:33989 (J:NL)
Coatings
Characterization of an iron boride coating produced by pack boronization of low carbon steel, 8:34007 (J:GB)
Corrosion
Corrosion of carbon steel in substoichiometric combustion gases, 8:34257 (BA:US)
Corrosion Protection
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Erosion
Slurry erosion of materials, 8:33003 (BA:US)
Fracture Properties
Medium carbon steel alloy design for wear applications, 8:33989 (J:NL)
Stress Corrosion
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Wear Resistance
Medium carbon steel alloy design for wear applications, 8:33989 (J:NL)

CARBONACEOUS MATERIALS
See also COAL
OIL SANDS
OIL SHALES
Chemical Reaction Kinetics
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Radiolysis
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)

CARBOXYLIC ACID SALTS
Gas Chromatography
Amonia gas: an improved reagent for chemical ionization mass spectrometry of bile acid methyl ester acetates, 8:34078 (J:US)
Liquid Column Chromatography
Amonia gas: an improved reagent for chemical ionization mass spectrometry of bile acid methyl ester acetates, 8:34078 (J:US)
Mass Spectroscopy
Amonia gas: an improved reagent for chemical ionization mass spectrometry of bile acid methyl ester acetates, 8:34078 (J:US)

CARBOXYLIC ACIDS
See also AMINO ACIDS
DICARBOXYLIC ACIDS
KETO ACIDS
Polymerization
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Radiolysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Structural Chemical Analysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)

CARCINOGEN SCREENING
Reviews
Evaluation of the host-mediated assay and body fluid analysis. A report of the US Environmental Protection Agency genetox program, 8:34640 (J:NL)

CARCINOGENESIS
See also LEUKEMOGENESIS
Chemical carcinogen (hydrazine et al.) induced carcinogenesis of human diploid cells in vitro. Annual progress report 1 Sep 81-31 Aug 82, 8:34612 (R:US)
Bibliographies
Excision repair of DNA damage. I. Enzymology and mechanisms of excision repair. Oncology overview, 8:34602 (R:US)
Information Systems
Carcinogenic potency, 8:34620 (RA:US)

Risk Assessment
Radiation epidemiology, 8:34591 (RA:US)
CARCINOGENS
See also PHORBOL ESTERS
Bioassay
Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R:DE:In German)
Cytological Techniques
Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R:DE:In German)
CARCINOMAS
Diagnosis
Reliability and accuracy of mammography in the diagnosis of breast carcinomas, 8:34532 (R:DE:In German)
Radiotherapy
Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R:DE:In German)
CARDIAC OUTPUT
See BLOOD CIRCULATION
CARDIOVASCULAR DISEASES
Etiology
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
CARIBOU
See DEER
CASCADE (EXTRACTION)
See EXTRACTION COLUMNS
CASEIN
Biosynthesis
Extracellular matrix influences on gene expression: the role of matrix components in modulating the differentiated phenotype of mammary epithelial cells, 8:34498 (RA:US)
CASINGS
See COVERINGS
CASKS
See also SPENT FUEL CASKS
Design
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
Leak Testing
Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:34223 (R:US)
Quality Assurance
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
CASTE (INSECTS)
See INSECTS
CATALYSTS
Bibliographies
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R:US)
Chemical Preparation
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R:US)
$CO + H_2$ reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
Deactivation
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R:US)
Infrared Spectra
Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts, 8:34171 (J:US)
Optimization
Application of modern surface analytical methods for the solution of problems of technical catalysts, 8:34089 (R:DE:In German)
Performance Testing
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R:US)
Sorptive Properties
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
Surface Properties
Application of modern surface analytical methods for the solution of problems of technical catalysts, 8:34089 (R:DE:In German)
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
CATALYTIC CRACKING
Catalysts
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R:US)
Chemical Reaction Kinetics
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal-conversion processes: Experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress reports No. 1 and 2, September 1981-February 1982, 8:32951 (R:US)
CATAPHORESIS
See ELECTROPHORESIS
CATARACTS
Radioinduction
Cataract production in mice by fractionated doses of ^{12}C particles or ^{60}Co gamma radiation, 8:34598 (RA:US)
CATAWBA-1 REACTOR
Reactor Licensing
Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1, 8:33698 (R:US)
Reactor Safety
Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1, 8:33698 (R:US)
CATAWBA-2 REACTOR
Reactor Licensing
Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1, 8:33698 (R:US)
Reactor Safety
Safety evaluation report related to the operation of Catawba Nuclear Station, Units 1 and 2. Docket Nos. 50-413 and 50-414. Suppl. 1, 8:33698 (R:US)
CATION EXCHANGE CAPACITY
See CATIONS
CATIONS
Hydration
Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces, 8:34121 (J:US)
Hydrolysis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Osmosis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Thermodynamic Activity
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
CATTAILS
Vegetative Propagation
Effects of size and growth rate on vegetative reproduction in Typha, 8:33360 (J:DE)

CAVITY RECEIVERS
Natural Convection
Experimental regulation of advanced solar central receivers. Final report, 8:33539 (R:US)
CAVITY RESONATORS
See also SUPERCONDUCTING CAVITY RESONATORS
Oscillation Modes
Monochromatic radio frequency accelerator cavity, 8:34263 (R:US)
CBA (BROOKHAVEN COLLIDING BEAM ACCELERATO
See ISABELLE STORAGE RINGS
CEA-ADL DUAL ALKALI PROCESS
Demonstration Programs
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
Flowsheets
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
Performance Testing
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
CELL CULTURES
Population Dynamics
Initial growth rate, population density, and cation content as limiting factors in the multiplication of nontransformed and transformed 3T3 cells, 8:34500 (BA:US)
CELL GROWTH (ANIMAL)
See ANIMAL CELLS
CELL KILLING
Radioinduction
Cellular and molecular radiobiology of heavy-ion beams, 8:34594 (RA:US)
Radiation survival studies with cultured normal human mammary epithelial cells, 8:34592 (RA:US)
CELL MEMBRANES
Biological Models
Biophysical studies of immune recognition, 8:34499 (RA:US)
Biophysics
Fundamental and applied studies on cell-membrane systems, 8:34496 (RA:US)
CELLS (ANIMAL)
See ANIMAL CELLS
CELLS (BACTERIAL)
See BACTERIA
CELLS (ELECTROLYTIC)
See ELECTROLYTIC CELLS
CELLULOSE
Bioconversion
Bioconversion of cellulose to liquid fuel (ethanol) and energy related chemicals, 8:33332 (R:SE:In Swedish)
CEMENTS
Additives
Hydration of fly ash cement and microstructure of fly ash cement pastes, 8:33017 (R:SE)
Hydration
Hydration of fly ash cement and microstructure of fly ash cement pastes, 8:33017 (R:SE)
CENTRAL RECEIVERS
Fatigue
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
Materials Testing
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
Tubes
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
CERAMIC MELTERS
Design
Physical modeling of a glass melter designed for vitrification of defense waste, 8:33208 (R:US)
Remote design features for the West Valley slurry-fed ceramic melter system, 8:33232 (R:US)
Engineered Safety Systems
Hazards analysis of TNX Large Melter-Off-Gas System, 8:33213 (R:US)
Functional Models
Physical modeling of a glass melter designed for vitrification of defense waste, 8:33208 (R:US)
Materials Testing
Evaluation of glass-contact materials for waste glass melters, 8:33207 (R:US)
Off-Gas Systems
Hazards analysis of TNX Large Melter-Off-Gas System, 8:33213 (R:US)
Performance
Physical modeling of a glass melter designed for vitrification of defense waste, 8:33208 (R:US)
CERAMICS
Microanalysis
Limitations of AEM-based x-ray microanalysis, 8:34079 (BA:US)
Research Programs
Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R:US)
CERIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
CERIUM 140 TARGET
Neutron Reactions
Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J:US)
CERIUM 144
Environmental Exposure Pathway
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Environmental Transport
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
CERN ISR
CERN Intersecting Storage Rings.
Accelerator Facilities
Data acquisition using the 168/E, 8:34321 (R:US)
Fast asynchronous level 1 pre-trigger for electrons at L = 10^{33}cm^{-2}sec^{-1}, 8:34300 (R:US)
Magnetic Spectrometers
Operation of the AFS at L = 1.4 x 10^{32} cm^{-2} sec^{-1}: a first look at data at high luminosity from the CERN ISR (Axial Field Spectrometer), 8:34301 (R:US)
CESIUM
Polarization
Reliable static electric dipole polarizabilities for heavy elements, 8:34101 (J:NL)
Precipitation
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
CESIUM 119
Beta-Plus Decay
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
CESIUM 120
Beta-Plus Decay
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
CESIUM 121
Beta-Plus Decay
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
CESIUM 122
Beta-Plus Decay
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)

CESIUM 123
Beta-Plus Decay
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
CESIUM 137
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Dosimetry
Role of the standards laboratory in brachytherapy. Final report, 8:34554 (R:US)
Environmental Exposure Pathway
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Environmental Transport
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Leaching
New hydrofracture facility at ORNL, 8:33194 (RA:US)
Radiation Monitoring
Monitoring of deactivation stations in nuclear power plants, 8:34376 (RA:CS:In Czech)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Foodstuffs, 8:34427 (RA:US)
Soil and vegetation, 8:34429 (RA:US)
Wildlife, 8:34428 (RA:US)
CESIUM CHLORIDES
Solubility
Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of Nacl and CaCl at 25°C, 8:34116 (J:US)
Thermodynamic Activity
Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of Nacl and CaCl at 25°C, 8:34116 (J:US)
CESIUM IONS
Ion Beams
Quadrupole beam-transport experiment for heavy ions under extreme space charge conditions (Cesium ion beams at 2 MeV and 1 ampere), 8:34284 (R:US)
CFU
Limited to colony formation on spleen.
Biological Radiation Effects
Response of mouse marrow colony forming units (CFU-S) to heavy charged particles, 8:34599 (RA:US)
Immunology
Evidence for a suppressor cell in short-term bone marrow cultures, 8:34495 (RA:US)
CHALKS
See LIMESTONE
CHARGED PARTICLES
In addition to the specific charged particles listed below, see also the list under ELEMENTARY PARTICLES.
See also ALPHA PARTICLES
BETA PARTICLES
IONS
Gravitational Fields
Approximate solution with torsion for a charged particle in a gauge theory of gravitation, 8:34874 (R:XA)
CHARGED-PARTICLE ACTIVATION
See ACTIVATION ANALYSIS
CHARGED PARTICLES
CHARMONIUM
Particle Structure
Charmonium spectroscopy from radiative decays of the J/psi and psi', 8:34753 (R:US)
CHARPAK CHAMBERS
See MULTIWIRE PROPORTIONAL CHAMBERS
CHEMICAL ANALYSIS
See also ACTIVATION ANALYSIS
NONDESTRUCTIVE ANALYSIS
NUCLEAR REACTION ANALYSIS
Research Programs
Analytical Chemistry Division annual progress report for period ending December 31, 1982, 8:34059 (R:US)
Reviews
Analytical chemistry in the People's Republic of China, 8:34053 (R:DE:In German)
CHEMICAL EFFLUENTS
Radiochemical Analysis
Hybrid chemical and nondestructive analysis technique, 8:34054 (R:US)
CHEMICAL EXPLOSIVES
See also NITROMETHANE
Chemical Preparation
New adducts of 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX), 8:34392 (J:DE)
Detonation Waves
Equation of state from detonation velocity measurements, 8:34391 (J:US)
Equations of State
Equation of state from detonation velocity measurements, 8:34391 (J:US)
Structural Chemical Analysis
New adducts of 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX), 8:34392 (J:DE)
CHEMICAL LASERS
Excitation
Study on the E-beam pulse width scaling for a 25-kilojoule KrF amplifier, 8:34229 (R:US)
CHEMICAL MUTAGENS
See MUTAGENS
CHEMICAL REACTION KINETICS
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J:NL)
Mathematical Models
Pattern formation in the Schloegl model of nonlinear kinetics, 8:34202 (J:NL)
Tracer Techniques
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)
CHEMICAL REACTIONS
See also CHEMISORPTION
CORROSION
DEHYDROGENATION
DESULFURIZATION
FISCHER-TROPSCH SYNTHESIS
HYDROGENATION
METHANATION
PHOTOCHEMICAL REACTIONS
WATER GAS PROCESSES
Catalysis
Modelling and scaleup of dispersed phase liquid-liquid reactors, 8:34160 (J:GB)
Computerized Simulation
Computer-guided exploration of synthetic pathways. Final progress report, 8:34093 (R:US)
Mathematical Models
Dynamic sensitivity analysis of chemical reaction systems: a variational method, 8:34151 (J:GB)
Unique and multiple solutions of a family of differential equations modeling chemical reactions, 8:34102 (J:US)
Sensitivity Analysis
Dynamic sensitivity analysis of chemical reaction systems: a variational method, 8:34151 (J:GB)
CHEMICAL REACTORS
Mathematical Models
Modelling and scaleup of dispersed phase liquid-liquid reactors, 8:34160 (J:GB)
CHEMICAL SHIMMING
See FLUID POISON CONTROL
CHEMICALS
See CARCINOGENS
MUTAGENS
SURFACTANTS
TUMOR PROMOTERS
CHEMISORPTION
Mathematical Models
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)

Monte Carlo study of diffusion in a model of an ordered absorbate, 8:34136 (J:GB)

CHILE
Energy Policy
Chile - energy situation 1981, 8:33789 (R:DE:In German)
Energy Supplies
Chile - energy situation 1981, 8:33789 (R:DE:In German)

CHIMNEYS
Liners
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)

CHINA
Bioreactors
Biogas in China 1981 - a travel report, 8:33327 (R:SE:In Swedish)

CHIRAL SYMMETRY
Symmetry Breaking
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)

CHLORINATED ALIPHATIC HYDROCARBONS
Chemical Reaction Kinetics
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)
Chemical Reactions
Activation of chemical reaction by impact of molecules on a surface, 8:34161 (J:US)

CHLORINATED AROMATIC HYDROCARBONS
Containment Systems
Field testing of PCB sorbent materials for use in outside capacitor areas, 8:34261 (RA:US)
Decomposition
Polychlorinated biphenyl chemical destruction processes, 8:33150 (RA:US)
Pollution Abatement
PCB compliance, assessment, and spill control guide, 8:34439 (R:US)
Solvent Extraction
Solvent extraction of polychlorinated biphenpyl, 8:33149 (RA:US)
Toxicity
PCB compliance, assessment, and spill control guide, 8:34439 (R:US)

CHLORINE 34
Hot Atom Chemistry
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)

CHLORINE 38
Hot Atom Chemistry
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)

CHLORINE 39
Hot Atom Chemistry
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)

CHLORINE IONS
Energy-Level Transitions
Lifetimes of low-lying $^2P^0$, ^2D, and $^2F^2$ states of the Al I isoelectronic sequence, 8:34730 (J:SE)
Ion-Atom Collisions
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R:US)
Recoil ions: production and uses, 8:34713 (RA:US)
Lamb Shift
Laser spectroscopy with fast heavy ion beams, 8:34717 (RA:US)
X-ray spectroscopy with fast heavy-ion beams, 8:34709 (RA:US)

CHLORINE ISOTOPES
See also CHLORINE 34
CHLORINE 38
CHLORINE 39
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)

CHLORINE LOGS
See NEUTRON-GAMMA LOGGING

CHLOROPHYLL
Extraction
Measuring chlorophyll a and ^{14}C-labeled photosynthate in aquatic angiosperms by the use of a tissue solubilizer (^{14}C-labelled photosynthate), 8:34491 (J:US)
Fluorescence
Orientation and energy transfer in chlorophyll monolayers diluted with hexadecane. Fluorescence and sensitized fluorescence, 8:34188 (J:IL)
Measuring Methods
Measuring chlorophyll a and ^{14}C-labeled photosynthate in aquatic angiosperms by the use of a tissue solubilizer (^{14}C-labelled photosynthate), 8:34491 (J:US)

CHLOROPLASTS
Photochemistry
Critical reassessment of the photosystem II content in bundle sheath chloroplasts of young leaves of Zea mays, 8:34492 (BA:US)

CHOLESTEROL
Biological Accumulation
Model precursors to high density lipoproteins, 8:34485 (RA:US)
Quantitative Chemical Analysis
Plasma lipoprotein stability and standardization, 8:34058 (RA:US)

CHROMATIN
See also NUCLEOSOMES
Cytological Techniques
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)
Histones
Histone variants and histone modifications in chromatin fractions from heterochromatin-rich Peromyscus cells, 8:34490 (J:US)
Molecular Biology
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)

CHROMATOGRAPHY
See also GAS CHROMATOGRAPHY
LIQUID COLUMN CHROMATOGRAPHY
Optimization
Recent advances in optimization strategies: chromatography, electrochemistry, and spectroscopy, 8:34071 (J:US)

CHROMIUM
Biological Effects
Germination and growth effects of hexavalent chromium in Orocol TL (a corrosion inhibitor) on Phaseolus vulgaris, 8:34614 (RA:US)
Oxidation
Oxidation of chromium in H_2-H_2O-H_2S gas mixtures, 8:33984 (BA:US)
Prediction of long-term impact of PGDP chromate sludge lagoon discharge, 8:34450 (RA:US)
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Sulfidation
Oxidation of chromium in H_2-H_2O-H_2S gas mixtures, 8:33984 (BA:US)
Surface Properties
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Transmission Electron Microscopy
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)

CHROMIUM ALLOYS
See also CHROMIUM STEELS
INCOLOY ALLOYS
RENE 41
STAINLESS STEELS

Corrosion
Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA:US)
Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R:US)
Oxidation
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Sulfidation
High temperature sulfidation properties of iron-chromium-base alloys, 8:33981 (BA:US)
Surface Properties
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Transmission Electron Microscopy
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)

CHROMIUM OXIDES
Catalytic Effects
Water gas shift reaction. I, 8:33273 (J:IN)
Corrosion Resistance
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)

CHROMIUM STEELS
See also CHROMIUM-MOLYBDENUM STEELS
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Mechanical Properties
Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R:US)
Microstructure
Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)

CHROMIUM-MOLYBDENUM STEELS
See also ALLOY-HT-9
Mechanical Properties
Slow-strain-rate testing of 2.25Cr-1Mo in molten-nitrate salt (450 AND 520°C), 8:33969 (R:US)

CHROMODYNAMICS
See QUANTUM CHROMODYNAMICS

CHROMOSOMES
Biological Radiation Effects
Role of base damage in aberration formation: interaction of aphidicolin and x-rays, 8:34607 (BA:US)

CHRYSENE
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)

CIRCUIT BREAKERS
Design
Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA:US)
Maintenance
Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA:US)
Performance
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Performance Testing
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)
Measuring system for high-power circuit breaker, 8:33627 (R:DE:In German)
Piezometry
Measuring system for high-power circuit breaker, 8:33627 (R:DE:In German)
Reliability
Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA:US)

CIRCUITS (ELECTRONIC)
See ELECTRONIC CIRCUITS

CIRCULAR CONFIGURATION
Computerized Simulation
Improved sampling in positron emission tomography, 8:34546 (RA:US)

CIRCULAR POINT COLLECTORS
See PARABOLIC DISH COLLECTORS

CIRCULATION (BLOOD)
See BLOOD CIRCULATION

CITIES
See URBAN AREAS

CLEAN WATER ACT
Prior to April 1980, FEDERAL WATER POLLUTION CONTROL ACT was used to index this concept.
Compliance
PGDP dike testing program, 8:33151 (RA:US)

CLIMATES
Computer Codes
CLIME: a climate analysis computer program, 8:33281 (J:US)
Variations
Modulation of fossil fuel production by global temperature variations, 8:33843 (J:GB)

CLINCH RIVER BREEDER REACTOR
Reactor Licensing
Safety evaluation report related to the construction of the Clinch River Breeder Reactor Plant. Docket No. 50-537. Suppl. 1, 8:33699 (R:US)
Reactor Safety
Safety evaluation report related to the construction of the Clinch River Breeder Reactor Plant. Docket No. 50-537. Suppl. 1, 8:33699 (R:US)

CLOSTRIDIUM
Growth
Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R:US)
Metabolism
Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas (Clostridium acetobutylicum), 8:33123 (RA:US)
Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R:US)
Screening
Isolation and screening of Clostridia for possible use in microbially enhanced oil recovery, 8:33109 (RA:US)

CLUSTERS (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS

CNEN BRAZIL
See BRAZILIAN CNEN

COAL
See also BLACK COAL
Availability
Assessing the role of coal in the world energy future, 8:33859 (RA:BR)
Chemical Analysis
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
Cleaning
Cleaning of steam coal prior to combustion, 8:32958 (R:SE:In Swedish)
Coal cleaning by physical methods prior to combustion, 8:33085 (R:SE:In Swedish)
Combustion
Bal 2 process, 8:33088 (R:SE:In Swedish)
Specifications and design of a laminar-flow isothermal drop tube furnace for studies of pulverized fuel combustion., 8:33089 (R:SE)

Combustion Control
Formation and reduction of NO sub (x) and POM in coal firing, 8:33057 (R:SE:In Swedish)
Combustion Heat
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Devolatilization
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)
Energy Models
Model documentation of the Short-Term Coal-Analysis System. Volume 3. SCOAL data documentation, 8:33858 (R:US)
Model documentation of the Short-Term Coal Analysis System. Volume 2. Model description (SCOAL), 8:33857 (R:US)
Model documentation of the Short-Term Coal-Analysis System. Volume 1. Model overview, 8:33856 (R:US)
Erosion
Slurry erosion of materials, 8:33003 (BA:US)
Fuel Consumption
Kilowatts from coal, 8:33023 (RA:US)
Hydrogenation
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)
Market
Analysis of transportation network model and applications to coal market studies (TFM Model), 8:33852 (R:US)
Material Balance
Evaluation of alternatives for treatment of PGDP steam plant fly ash, 8:33018 (RA:US)
Mechanical Properties
Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion, 8:32976 (RA:US)
Thermomechanical cavity growth modeling, 8:32977 (RA:US)
Nigeria
Nigeria - energy situation 1981, 8:33839 (R:DE:In German)
Pyrolysis
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)
Research Programs
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Relationship of coal science to coal technology, 8:33015 (R:US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
Swelling
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Thermodynamic Properties
Thermomechanical cavity growth modeling, 8:32977 (RA:US)
Transport
Analysis of transportation network model and applications to coal market studies (TFM Model), 8:33852 (R:US)
Uses
Relationship of coal science to coal technology, 8:33015 (R:US)

COAL CHEMICALS
See COAL EXTRACTS

COAL DEPOSITS
See also COAL SEAMS
Degassing
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)
Geology
Colorado lignite for underground coal gasification, 8:32983 (RA:US)
Resource Assessment
Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)

COAL EXTRACTS
Desulfurization
Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J:US)

COAL FINES
Agglomeration
Briquetting behaviour of the raw fine coal sulphite waste lye mixtures and stability of the agglomerates with pressure gasification, 8:33083 (R:DE:In German)

COAL GASIFICATION
See also FLASH HYDROPYROLYSIS PROCESS
LURGI PROCESS
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Multihydrotorting of coal (Patent), 8:33010 (P:US)
Chemical Reaction Kinetics
Investigations on the influence of mineral matter of coals and cokes on the kinetics of gasification with hydrogen and water vapour, 8:33014 (R:DE:In German)
Commercialization
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Corrosion
Corrosion behavior of materials in low- and medium-Btu coal-gasification environments, 8:33000 (BA:US)
Erosion-corrosion of various alloys in a simulated coal gasification environment, 8:33006 (BA:US)
Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA:US)
Erosion
Erosion-corrosion of various alloys in a simulated coal gasification environment, 8:33006 (BA:US)
Fluidized Bed
Investigation of flow bed models for hydrogenating coal gasification, 8:32959 (R:DE:In German)
Hot Gas Cleanup
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Materials Testing
Wear of refractories in slagging gasifiers, 8:34004 (BA:US)
Pilot Plants
Fixed-bed gasification, 8:32953 (R:US)
Research Programs
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
Solar Process Heat
Synthesis gas production by the solar gas process, 8:32999 (J:US)
Technology Assessment
Fixed-bed gasification, 8:32953 (R:US)
Test Facilities
Report of the Energy Research Advisory Board study group to evaluate the proposed Coal-Gasification Multi-Test Facility (Evaluation of proposed large scale equipment test facilities), 8:32956 (R:US)

COAL GASIFICATION PLANTS
Capitalized Cost
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Construction
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)

Design
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Engineering
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Equipment
Assessment of materials and components performance at gasification pilot plants, 8:32997 (J:US)
Financing
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Materials
Assessment of materials and components performance at gasification pilot plants, 8:32997 (J:US)
Operating Cost
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Planning
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Waste Water
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment, 8:32960 (R:US)
Water Resources
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)

COAL LIQUEFACTION
See also EXXON LIQUEFACTION PROCESS
FLASH HYDROPTROLYSIS PROCESS
SRC-II PROCESS
Bench-Scale Experiments
Improving coal-liquid quality by heavy-distillate recycle, 8:32945 (R:US)
Catalysts
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R:US)
Environmental Impacts
Environmental impacts program, 8:33066 (RA:US)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)

COAL LIQUEFACTION PLANTS
Corrosion
Chlorine transport and corrosion mechanisms in coal liquids, 8:33002 (BA:US)
Mechanisms of corrosion and alloy response in coal liquid systems containing chlorides, 8:33004 (BA:US)
Level Indicators
Feasibility study of acoustic sensors for slurry-level measurements in coal-liquefaction systems, 8:32942 (R:US)
Waste Water
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment, 8:32960 (R:US)

COAL LIQUIDS
Chemical Analysis
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
Combustion
Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA:US)
Corrosive Effects
Chlorine transport and corrosion mechanisms in coal liquids, 8:33002 (BA:US)
Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA:US)
Hydrogenation
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes. Task 10. Hydrotreating of EDS and H-Coal blends for biological studies. Seventh interim report, 8:32947 (R:US)
Mutagen Screening
Improving coal-liquid quality by heavy-distillate recycle (Product boiling below 590°F), 8:32945 (R:US)
Oil Spills
Thin-film evaporation of coal liquids, 8:33067 (R:US)
Recycling
Improving coal-liquid quality by heavy-distillate recycle (Product boiling below 590°F), 8:32945 (R:US)

COAL MINES
Construction
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)
Degassing
Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/1982, 8:33078 (R:US)
Waste Water
Technique for the purification of metal containing mining waters. Literature survey, 8:33056 (R:SE:In Swedish)

COAL MINING
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Ventilation Systems
Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982, 8:33077 (R:US)

COAL PREPARATION
Coal cleaning by physical methods prior to combustion, 8:33085 (R:SE:In Swedish)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)

COAL RESERVES
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)

COAL SEAMS
Degassing
Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/1982, 8:33078 (R:US)
Fracturing
Project Thunderbird: a nuclear trigger for coal gasification, 8:33011 (J:US)
Permeability
Site characterization: geophysical R and D needs, 8:32986 (RA:US)
State of the Belgian-German experiment of underground gasification, 8:32975 (RA:US)
Status of geotechnical studies at the Texas A and M University in situ gasification trials (Alcoa/Rockdale site in Milam County, Texas), 8:32966 (RA:US)
Thickness
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)

COAL TAR
Toxicity
Health Hazard Evaluation Report No. HHA-80-238-931, new York Port Authority, Brooklyn, New York, 8:34630 (R:US)

COAL-DERIVED LIQUIDS
See COAL LIQUIDS

COAL-FIRED MHD GENERATORS
Boilers
Convective and radiative heat transfer in MHD radiant boilers, 8:33880 (J:US)
Seed-Slag Interactions
Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R:US)
COAL-OIL MIXTURES
See COAL
FUEL OILS
FUEL SLURRIES
COASTAL WATERS
Nutrients
Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling, 8:34509 (J:US)
Wave Power
Wave data from Swedish coastal waters 1979-80, 8:33580 (R:SE:In Swedish)
COATING PROCESSES
See SURFACE COATING
COATING (SURFACE)
See SURFACE COATING
COBALT
Biological Effects
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
Catalytic Effects
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Crystal Structure
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
COBALT 59 TARGET
Photonuclear Reactions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
COBALT 60
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Wildlife, 8:34428 (RA:US)
COBALT ALLOYS
See also COBALT BASE ALLOYS
INCONEL 738
RENE 41
Microstructure
Hydrogen reduction of cobalt ferrite, 8:33992 (J:US)
Reduction
Hydrogen reduction of cobalt ferrite, 8:33992 (J:US)
COBALT BASE ALLOYS
Corrosion
Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA:US)
Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA:US)
COBALT CHLORIDES
Hydrolysis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Osmosis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Thermodynamic Activity
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
COBALT COMPLEXES
Chemical Reaction Kinetics
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Decomposition
Concurrent and competitive homolysis and elimination reactions of (α-phenylethyl)aquocobaloxime, 8:34115 (J:US)
Electron Transfer
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Excitation
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Oxidation
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Photochemical Reactions
Photochemical energy conversion and solution kinetics, 8:34177 (R:US)
COBALT SULFIDES
Catalytic Effects
Disposable catalyst for coal liquefaction, 8:33008 (J:US)
COGENERATION
Prior to November 1980, this concept was indexed to CO-GENERATION.
See COGENERATION
Boiler Fuels
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)
Economic Analysis
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)
Performance
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)
COGENERATION PLANTS
See DUAL-PURPOSE POWER PLANTS
COILS (MAGNETIC)
See MAGNET COILS
COKE
Quenching
Investigation of flow bed models for hydrogenating coal gasification, 8:32959 (R:DE:In German)
COKE OVENS
Capacity
Coke-Making 1990: World coke demand and coke ovem capacity requirements in 1985 and 1990 with a view into the 1990s, 8:33096 (R:DE)
Forecasting
Coke-Making 1990: World coke demand and coke ovem capacity requirements in 1985 and 1990 with a view into the 1990s, 8:33096 (R:DE)
Personnel
Carcinogen assessment of coke oven emissions (revised draft), 8:33100 (R:US)
COLLECTIVE MODEL
Relationship between the Bohr collective model and the interacting boson model, 8:34848 (BA:US)
COLLIDING BEAMS
Particle Identification
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R:US)
COLLIERIES
See COAL MINES
COLOGNE SPIRITS
See ETHANOL
COLONY FORMING UNITS
See CFU
COLORADO
Coal Deposits
Colorado lignite for underground coal gasification, 8:32983 (RA:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)

Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Resource Assessment
National Uranium Resource Evaluation: intermediate-grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado, 8:33176 (R:US)

COLORIMETRY
See ABSORPTION SPECTROSCOPY

COLUMBIA RIVER
Radioecology
Columbia River radiological monitoring, 8:34458 (RA:US)
Water Quality
Columbia River water quality monitoring, 8:34456 (RA:US)

COLUMBIUM
See NIOBIUM

COLUMNS (EXTRACTION)
See EXTRACTION COLUMNS

COLUMNS (MECHANICAL)
See MECHANICAL STRUCTURES

COMBINED STEAM-POWER GENERATION
See COGENERATION

COMBUSTION CHAMBERS
Combustion Products
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)
Comparative Evaluations
Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA:US)
Efficiency
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)
Vortex Flow
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)
Investigations of flowfields found in typical combustor geometries, 8:34234 (R:US)

COMBUSTION PRODUCTS
Chemical Composition
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)
Temperature Distribution
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)
Velocity
Exhaust gas measurements in a propane fueled swirl stabilized combustor, 8:34255 (R:US)

COMMERCIAL BUILDINGS
Computer Codes
M.E.P.A.: micro-computer energy programs for architects, 8:33454 (J:US)
Daylighting
Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J:US)
Passive solar commercial building in Minnesota, 8:33537 (J:US)
Direct Gain Systems
Passive solar commercial building in Minnesota, 8:33537 (J:US)
Energy Consumption
M.E.P.A.: micro-computer energy programs for architects, 8:33454 (J:US)
Heating Load
F-load: a building heating load calculation program, 8:33452 (J:US)
Passive Solar Cooling Systems
Overview of designs from the DOE Passive Commercial Buildings Program, 8:33503 (J:US)
Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J:US)
Passive Solar Heating Systems
Economic analysis of selected passive solar commercial buildings, 8:33502 (J:US)
Evaluation of the Los Alamos Scientific Laboratory's residential passive solar methods applied to small commercial buildings, 8:33464 (J:US)
Overview of designs from the DOE Passive Commercial Buildings Program, 8:33503 (J:US)
Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J:US)
Trombe Walls
Obermeyer headquarters and warehouse, 8:33497 (J:US)
Solar retrofit of Vintage Auto Parts, Woodinville, WA, 8:33498 (J:US)

COMMUNITIES
See also PLANNED COMMUNITIES
Energy Policy
Comparison of approaches for developing community energy plans, 8:33849 (J:US)

COMPACT TORUS
Prior to October 1982, this concept was indexed to THERMONUCLEAR DEVICES or to a particular experiment if known, e.g., REVERSE-FIELD PINCH.
First Wall
Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R:US)

COMPOSITE MATERIALS
See also SUPERCONDUCTING COMPOSITES
Dynamic Loads
Calculation of blade-data for the Hamilton standard structural analysis of the composite blade for the 18 meter diameter rotor and a comparison with FFA-calculation, 8:33605 (R:SE)
Materials Testing
Design Allowables Test program, Celion 3000/PMR-15 and Celion 6000/PMR-15, graphite/polyimide composites. Final Report, 8:34011 (R:US)
Mechanical Properties
Design Allowables Test program, Celion 3000/PMR-15 and Celion 6000/PMR-15, graphite/polyimide composites. Final Report, 8:34011 (R:US)
Technology Assessment
High temperature composites. Status and future directions, 8:34010 (R:US)

COMPOUND-NUCLEUS REACTIONS
Computer Calculations
JULIAN II. A code for multiple-chance fission and multi-step particle and gamma ray emission in compound nuclear reactions, 8:33718 (RA:IL)
Cross Sections
Improved formulas for compound nucleus cross sections, 8:34849 (J:US)

COMPOUNDS (ORGANIC)
See ORGANIC COMPOUNDS

COMPUTER CODES
Computer codes are indexed by their initial letter and CODES, e.g., A CODES. If the code name begins with a number the code is indexed to NUMBER CODES.
B Codes
Improvement of reactor physics design methods for plutonium recycling in boiling water reactors (BPSPU code), 8:33663 (R:DE:In German)
Longitudinal unbalanced loads on transmission-line structures: documentation of computer programs BRODI2 and BROFLX, 8:33660 (R:US)
C Codes
Analysis of the metallic containment integrity of Angra I (Loss of coolant pressure and temperature history; CONDRU-4 Code), 8:33745 (RA:BR:In Portuguese)
Applications manual for analyzing landfill methane-recovery data using the Computer Analysis of Field Data (CAFD) interactive graphics system, 8:33940 (R:US)
CLIME: a climate analysis computer program, 8:33281 (J:US)
Critical review of the reactor-safety study radiological health effects model. Final report, 8:33766 (R:US)
Improved diagnostic model for estimating wind energy, 8:33589 (R:US)
Validation of CALPAS3 computer simulation program, 8:33465 (J:US)

D Codes
DACRIN: a computer program for calculating organ dose from acute or chronic radionuclide inhalation, 8:34601 (R:US)
E Codes
EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R:US)
Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report, 8:33798 (R:US)
F Codes
FFSM: Far-Field State Model. Technical report, 8:33224 (R:US)
Programmer's guide to FFE: a fast front-end data-acquisition program, 8:34933 (R:US)
Radionuclide transport code development in support of nuclear waste storage investigations, 8:33245 (R:US)
G Codes
GETOUT: a computer code for one-dimensional analytical solution for radionuclide transport, 8:33242 (R:US)
I Codes
Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2, 8:33762 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3, 8:33763 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): user's guide, 8:33761 (R:US)
J Codes
JULIAN II. A code for multiple-chance fission and multi-step particle and gamma ray emission in compound nuclear reactions, 8:33718 (RA:IL)
M Codes
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
MEGA (Mechanical Engineering General Analysis) user's document, 8:34967 (R:US)
MMT: a random-walk one-dimensional multicomponent mass-transport code, 8:33241 (R:US)
N Codes
Nuclear class 1 piping stress analysis (TRHEAT Code; NUPIPE Code), 8:33746 (RA:BR:In Portuguese)
O Codes
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface, 8:33765 (R:US)
P Codes
PABLM: a computer code to compute accumulated radiation doses from radionuclides transported to aquatic and terrestrial pathways in the biosphere, 8:33251 (R:US)
PHREEQE: a geochemical speciation and mass-transfer code suitable for nuclear waste performance assessment, 8:34676 (R:US)
PRP-4: an updated version of the discounted-cash-flow program PRP, 8:34964 (R:US)
R Codes
RECON: a computer program for analyzing repository economics. Documentation and user's manual, 8:33188 (R:US)
User's guide for the REBUS-3 fuel cycle analysis capability, 8:33701 (R:US)
S Codes
SSBAPAC user manual, 8:34925 (R:US)
Stirling-engine thermodynamic analysis: a users guide to SEAM1, 8:34262 (R:US)
T Codes
Nuclear class 1 piping stress analysis (TRHEAT Code; NUPIPE Code), 8:33746 (RA:BR:In Portuguese)
Toolpack Fio library installers' guide, 8:34955 (R:US)
Validation of the three-dimensional code TRITON, 8:33713 (RA:IL)
Validation of the three-dimensional code TRITON, 8:33723 (RA:IL)
Validation
Validation of annual average air concentration predictions from the AIRDOS-EPA computer code, 8:34411 (RA:US)
Validation of CALPAS3 computer simulation program, 8:33465 (J:US)
COMPUTER LANGUAGES
See PROGRAMMING LANGUAGES
COMPUTER NETWORKS
Performance
High-performance computing at Los Alamos, 8:34960 (R:US)
Modeling and monitoring a LAN (Local Area Network), 8:34969 (R:US)
Secrecy Protection
Security and risk analysis at Savannah River, 8:34957 (R:US)
COMPUTER PROGRAMMING
See PROGRAMMING
COMPUTER PROGRAMS
See COMPUTER CODES
COMPUTER-AIDED DESIGN
Interactive Display Devices
Electronics engineer's design station, 8:34252 (J:US)
COMPUTERS
See also MICROPROCESSORS
Japanese Organizations
Japanese supercomputer technology, 8:34970 (J:US)
Research Programs
Japanese supercomputer technology, 8:34970 (J:US)
Secrecy Protection
Security and risk analysis at Savannah River, 8:34957 (R:US)
Specifications
Supercomputer requirements for theoretical chemistry, 8:34168 (J:US)
CONCRETES
Compressibility
Effects of curing and aging on the triaxial properties of concrete in underground structures, 8:34044 (R:US)
Mechanical Properties
Analytical and experimental studies on penetration into geological targets, 8:34225 (R:US)
Physical Properties
Effects of curing and aging on the triaxial properties of concrete in underground structures, 8:34044 (R:US)
Radiolysis
Gas production from alpha radiolysis of concrete containing TRU incinerator ash. Progress report 2, August 1-November 30, 1978, 8:34043 (R:US)
CONDENSED AROMATICS
See also ANTHRACENE
BENZANTHRACENE
BENZOPYRENE
CHRYSENE
DIMETHYLBENZANTHRACENE
NAPHTHALENE
PHENANTHRENE
PYRENE
TRIPHENYLENE
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Photolonization
Laser-two-photon ionization of organic molecules in dielectric liquids, 8:34184 (J:NL)
Radiolysis
Optical studies of hydronaphthyl radicals embedded in dihydronaphthalene crystal, 8:34204 (J:GB)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
CONDENSERS
Field Tests
Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site, 8:33565 (R:US)
CONDUCTIVITY (THERMAL)
See THERMAL CONDUCTIVITY
CONGENITAL DISEASES
Radiosensitivity Effects
Intrinsic factors that can affect sensitivity to chromosome-aberration induction, 8:34573 (R:US)

CONNECTICUT
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
CONSERVATION (ENERGY)
See ENERGY CONSERVATION
CONSOLES
Alarm Systems
Near-term improvements for nuclear power plant control room annunciator systems (PWR; BWR), 8:33730 (R:US)
CONTACT RADIOTHERAPY
See RADIOTHERAPY
CONTACTORS
See SWITCHES
CONTAINERS
See also CASKS
PRESSURE VESSELS
REACTOR VESSELS
TANKS
Impact Tests
Impact tests with fuel element cans, 8:34218 (R:DE:In German)
Stress Analysis
Development up to the construction stage of a quasiliquid surface storage, in particular for a liquid gas, ball thrust container, 8:34216 (R:DE:In German)
CONTAINMENT SHELLS
Deformation
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
Stress Analysis
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
CONTAINMENT SYSTEMS
Design
PGDP dike testing program, 8:33151 (RA:US)
Failures
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)
Recommendations
PGDP dike testing program, 8:33151 (RA:US)
Ventilation Systems
Risk assessment of filtered-vented containment options for a BWR Mark I containment, 8:33774 (BA:US)
CONTENT ANALYSIS
See CHEMICAL ANALYSIS
CONTROL ROOMS
Consoles
Near-term improvements for nuclear power plant control room annunciator systems (PWR; BWR), 8:33730 (R:US)
CONVECTIVE LOOP HOUSES
See DOUBLE ENVELOPE BUILDINGS
COOLANT CLEANUP SYSTEMS
Electromagnetic Filters
Application of electromagnetic filter in water treatment in pressurized water reactor power plant, 8:33677 (RA:CS:In Czech)
Development of electromagnetic filter for removing suspended material from water circuit, 8:33725 (RA:CS:In Czech)
Organic Ion Exchangers
Purification of primary circuit coolant of light water reactor with Wofatit RH cation exchanger, 8:33676 (RA:CS:In Czech)
Radiation Monitoring
Monitoring of deactivation stations in nuclear power plants, 8:34376 (RA:CS:In Czech)
COOLANT LOOPS
For reactors use REACTOR COOLING SYSTEMS or IN PILE LOOPS.
Design
Design of a pressurized water loop heated by electric resistances, 8:33669 (RA:BR:In Portuguese)
COOLANTS
See also specific coolant materials.
Waste Processing
Reclamation and disposal of water-based machining coolants, 8:34451 (RA:US)
COOLERS
See HEAT EXCHANGERS
COPOLYMERS
Photolysis
Photoprocesses in copolymers of methacrylophenone with methyl methacrylate: photodegradation and intramolecular energy migration, 8:34180 (J:US)
COPPER
Erosion
Material loss and ripple formation during solid particle erosion at 30° impact angles, 8:33983 (BA:US)
Neutron Reactions
Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J:US)
Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV, 8:34803 (J:US)
Oxidation
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Surface Properties
High sensitivity surface crystallography: illustrative LEED analyses of Cu(100) and Ag(110), 8:33990 (J:GB)
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Toxicity
Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery, 8:33118 (RA:US)
Transmission Electron Microscopy
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
COPPER ALLOYS
See also COPPER BASE ALLOYS
Physical Radiation Effects
Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R:US)
X-Ray Fluorescence Analysis
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)
X-Ray Spectra
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)
COPPER BASE ALLOYS
Electronic Structure
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R:US)
Phase Transformations
Study of Cu-Be alloys in the vicinity of the eutectoid composition, 8:33999 (TG:US)
COPPER COMPLEXES
Photochemistry
Photochemical properties of copper complexes, 8:34187 (J:NL)
Redox Reactions
Photochemical properties of copper complexes, 8:34187 (J:NL)
COPPER FLUORIDES
Synthesis
Study on metal fluoride products formation caused by the electric arc in SF_6, 8:34039 (RA:US)
COPPER SULFIDES
Production
New methods for preparing Cu_xS-CdS solar cell semiconductor materials. Final report, 8:33324 (R:XE:FR)
CORDOVA QUAD CITIES-1 REACTOR
See QUAD CITIES-1 REACTOR

CORDOVA QUAD CITIES-2 REACTOR
See QUAD CITIES-2 REACTOR
CORES (DRILL)
See DRILL CORES
CORES (REACTOR)
See REACTOR CORES
CORN (MAIZE)
See MAIZE
CORN STOVER
See AGRICULTURAL WASTES
MAIZE
CORONA DISCHARGES
Acoustic Detection
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Beam Extraction
Mass spectrometry of low energy ions extracted from medium pressure air coronas, 8:34704 (RA:US)
Electric Currents
dc and pulse components of positive corona current from two interacting needles in air, 8:34735 (RA:US)
Frequency Analysis
dc and pulse components of positive corona current from two interacting needles in air, 8:34735 (RA:US)
Ionic Composition
Mass spectrometry of low energy ions extracted from medium pressure air coronas, 8:34704 (RA:US)
Pressure Dependence
Corona stabilization in SF_6/N_2 mixtures under impulse conditions, 8:34734 (RA:US)
Stabilization
Corona stabilization in SF_6/N_2 mixtures under impulse conditions, 8:34734 (RA:US)
CORROSION
See also STRESS CORROSION
Meetings
Corrosion-erosion-wear of materials in emerging fossil-energy systems, 8:33976 (B:US)
CORROSION PRODUCTS
Crystal Growth
Model for the growth of a two-phase corrosion scale, 8:33970 (R:US)
Raman Spectra
Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R:US)
COSMIC GAMMA BURSTS
Emission Spectra
Analyses of the Konus catalogue of gamma-ray bursts with the thermal synchrotron model, 8:34691 (R:US)
On the nature of 2 gamma bursts with spectral evolutions observed by the Konus experiment, 8:34690 (R:US)
COSMIC GAMMA SOURCES
Mathematical Models
Analyses of the Konus catalogue of gamma-ray bursts with the thermal synchrotron model, 8:34691 (R:US)
COSMIC PARTICLES
See COSMIC RADIATION
COSMIC RADIATION
From sources other than the sun; not for SOLAR RADIATION.
Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection, 8:34682 (R:SU:RU)
Emission Spectra
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4, 8:34688 (R:US)
Interactions
Study of the diffuse galactic gamma radiation, 8:34685 (R:US)
COSMOGONY
See COSMOLOGY
COSMOLOGICAL MODELS
General Relativity Theory
Ambiguity of limiting transition from the Brans-Dicke theory to the Einstein theory, 8:34681 (RA:SU:In Russian)
COSMOLOGY
High Energy Physics
Non-empty universe, 8:34680 (R:US)
Unified Gauge Models
Astrophysics and grand unification, 8:34693 (BA:US)
COSMOS
See UNIVERSE
COUNTERS (RADIATION)
See RADIATION DETECTORS
COUNTY BUILDINGS
See PUBLIC BUILDINGS
COURT BUILDINGS
See PUBLIC BUILDINGS
COVERINGS
Construction
Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982, 8:33199 (R:US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982, 8:33198 (R:US)
Design
Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982, 8:33199 (R:US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982, 8:33198 (R:US)
CRACKS
Porosity
Determination of crack porosity from ratios of static and dynamic bulk moduli, 8:33573 (RA:US)
CREEP
Radioinduction
Relationships of irradiation creep to swelling implicit in the theories of these processes, 8:33957 (R:US)
CREOSOTE
Toxicity
Health Hazard Evaluation Report No. HHA-80-238-931, new York Port Authority, Brooklyn, New York, 8:34630 (R:US)
CRISTOBALITE
Health Hazards
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
CRITICALITY ACCIDENTS
See RADIATION ACCIDENTS
CRNL MP TANDEM ACCELERATOR
Mass Spectrometers
Chalk River accelerator dating facility, 8:34342 (BA:US)
CROPS
Production
Impacts of technology on US cropland and rangeland productivity, 8:34475 (R:US)
Ultraviolet Radiation
Response of different crop and vegetable cultivars to UV-B-irradiance: preliminary results, 8:34650 (RA:DE)
CROSS SECTIONS
See also EXCITATION FUNCTIONS
Meetings
Nuclear cross sections for technology, 8:34794 (B:US)
CROSSED BEAMS
See COLLIDING BEAMS
CROTON OIL
Carcinogenesis
Resistance of germ-free athymic nude mice to two-stage skin carcinogenesis, 8:34644 (BA:US)
CRUDE OIL
See PETROLEUM
CRUSTACEANS
Temperature Effects
Thermal resistance of juvenile crayfish, Cambarus bartoni (fabricius): experiment and model, 8:34611 (J:US)
CRYSTAL COUNTERS
Circular Configuration
Improved sampling in positron emission tomography, 8:34546 (RA:US)
CRYSTALLINE ROCKS
See IGNEOUS ROCKS
CUCUMBERS
Ultraviolet Radiation
Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA:DE)
Effects of UV B radiation on composition of two crop species during mild water stress, 8:34658 (RA:DE)

Effects of UV-B irradiation on leaf resistances in two crop species during mild water stress, 8:34659 (RA:DE)

CULTURES (CELLS)
See CELL CULTURES

CURIUM 242 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CURIUM 244 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CURIUM 245 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CURIUM 246 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CURIUM 247 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CURIUM 248 TARGET
Neutron Reactions
Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

CYCLIC ADENOSINE MONOPHOSPHATE
See AMP

CYCLOALKANES
See also ADAMANTANE
CYCLOHEXANE
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Ionization Potential
Herndon's structure-resonance theory. On the valence structure count for conjugated radical cations, 8:34164 (J:YU)
Molecular Structure
Herndon's structure-resonance theory. On the valence structure count for conjugated radical cations, 8:34164 (J:YU)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Valence
Herndon's structure-resonance theory. On the valence structure count for conjugated radical cations, 8:34164 (J:YU)

CYCLOALKENES
Chemical Preparation
Synthesis and structure of dicyclopentenouranocene $U[C_5H_6(CH_3)_3]_2$, 8:34207 (J:US)
Crystal Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_6(CH_3)_3]_2$, 8:34207 (J:US)
Energy-Level Transitions
Singlet-singlet absorption spectra of diphenylpolyenes, 8:34179 (J:NL)
Molecular Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_6(CH_3)_3]_2$, 8:34207 (J:US)
Photolysis
Singlet-singlet absorption spectra of diphenylpolyenes, 8:34179 (J:NL)

CYCLOHEXANE
Sorption
Volume dependence of the elastic equation of state. 2. Solution-cured poly(dimethylsiloxane), 8:34156 (J:US)

CYCLOTRONS
See also ISOCHRONOUS CYCLOTRONS
MICROTRONS
VARIABLE ENERGY CYCLOTRONS
Evaluation
Treatment of cancer with heavy charged particles, 8:34548 (RA:US)
Ion Sources
ECR heavy-ion source for the LBL 88-inch cyclotron, 8:34320 (R:US)

CYPRUS
Energy Supplies
Cyprus - energy situation 1981, 8:33834 (R:DE:In German)

D

DAPHNIA
Behavior
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34457 (J:US)
Metabolism
Production and release of cyclic AMP by Daphnia pulex: implications of grazing activity, 8:34507 (J:US)

DARK REPAIR
See BIOLOGICAL REPAIR

DARRIEUS ROTORS
Aerodynamics
Wakes of isolated Darrieus turbines, 8:33614 (R:US)
Performance Testing
Testing of a small Darrieus turbine. Final report, 8:33608 (R:SE:In Swedish)

DATA ACQUISITION SYSTEMS
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Data acquisition using the 168/E (CERN ISR), 8:34321 (R:US)
Calculators
Interfacing a $10 calculator for data acquisition, 8:33436 (J:US)
Design
Design of a moderate-cost microcomputer data acquisition system for experimental investigations of thermal systems, 8:33907 (J:US)

DATA ANALYSIS
Analytical Solution
Explicit approximate solutions for S/sub B/, 8:34976 (J:US)

DATA BASE MANAGEMENT
Distributed resource management: deadlocks, 8:34979 (BA:US)

DATA COVARIANCES
Data uncertainties
Workshop on uncertainty analysis of postclosure nuclear waste isolation system performance, 8:33223 (R:US)

DATA PROCESSING
Manipulation of unit facts.
Filters
Adaptive Gaussian filtering and local frequency estimates using local curvature analysis, 8:34973 (J:US)
Noise
Adaptive Gaussian filtering and local frequency estimates using local curvature analysis, 8:34973 (J:US)

DAYLIGHTING
Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting, 8:33499 (J:US)
Aesthetics
Art of daylighting, 8:33915 (J:US)
Demonstration Programs
Commercial office daylighting demonstration, 8:33921 (J:US)
Design
Approach to teaching calculation procedures for passive design, 8:33483 (J:US)
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Education
Development of a daylighting resourcebook and curriculum at Rensselaer Polytechnic Institute's School of Architecture, 8:33912 (J:US)

Manuals
Development of a daylighting resourcebook and curriculum at Rensselaer Polytechnic Institute's School of Architecture, 8:33912 (J:US)
Meetings
6th national passive-solar conference, 8:33413 (B:US)
Scale Models
Use of physical scale model for daylighting analysis, 8:33920 (J:US)
Sun Shades
Rainy day shading: the effect of shading devices on daylighting and thermal performance, 8:33919 (J:US)

DEACTIVATION
Bibliographies
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R:US)
Mathematical Models
Novel approaches concerning catalyst deactivation. Quarterly report No. 2, October 1, 1982-January 1, 1983, 8:32957 (R:US)

DECIDUOUS TREES
See TREES

DECISION MAKING
Engineering
Decisionmaking organizations with acyclical information structures. Technical report, 8:34476 (R:US)
Optimization
Decisionmaking organizations with acyclical information structures. Technical report, 8:34476 (R:US)

DEER
Progesterone
Use of serum progesterone levels to detect pregnancy in elk, 8:34567 (J:US)

DEGREE DAYS
Calculation Methods
Degree-days for variable base temperatures, 8:33470 (J:US)

DEHPA
See HDEHP

DEHYDROGENATION
Catalysts
Effect of additives to iron oxide in the selective oxidative dehydrogenation reactions, 8:33140 (J:US)

DELAWARE
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

DELAYED RADIATION INJURIES
See RADIATION INJURIES

DENSITY (ENERGY-LEVEL)
See ENERGY-LEVEL DENSITY

DENSITY LOG
See GAMMA-GAMMA LOGGING

DENSITY (NEUTRON)
See NEUTRON DENSITY

DEOXYPENTOSE NUCLEIC ACID
See DNA

DEOXYRIBONUCLEIC ACID
See DNA

DEPLETION (ISOTOPIC)
See ISOTOPE SEPARATION

DESOXYRIBONUCLEIC ACID
See DNA

DESULFURIZATION
Bench-Scale Experiments
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Catalysts
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Cost
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Design
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Field Tests
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Flowsheets
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
Information Systems
Trends in commercial application of FGD technology, 8:33024 (RA:US)
Maintenance
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Materials
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Modifications
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Operation
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Sludges
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)
Solid Wastes
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Technology Assessment
Trends in commercial application of FGD technology, 8:33024 (RA:US)

DETECTORS (RADIATION)
See RADIATION DETECTORS

DETONATION WAVES
Velocity
Equation of state from detonation velocity measurements, 8:34391 (J:US)

DEUTERIUM
Chemical Reaction Kinetics
Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R:US)
Isotope Effects
^{13}CNMR study of the solution dynamics of 1,3,5-triphenylbenzene; analysis of motion about the phenyl-phenyl bond, 8:34158 (J:GB)
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Experimental studies of two dimensional melting, 8:34153 (BA:US)
Studies of the formation and structure of homomolecular and heteromolecular clusters, 8:34127 (J:NL)
Studies of gas-phase clusters: the solvation of HNO_3 in microscopic aqueous clusters, 8:34120 (J:NL)
Photoionization
Photoelectron angular distributions from H_2 and D_2, 8:34181 (J:NL)
Shock Waves
Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R:US)

Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R:US)

DEUTERIUM OXIDES
See HEAVY WATER

DEUTERIUM TARGET
Neutron Reactions
Thermal neutron capture cross section in deuterium, 8:34798 (J:US)
Photonuclear Reactions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
Polarized Targets
Dynamic deuteron polarization measurements performed in a new type of horizontal dilution cryostat, 8:34304 (R:DE)

DEUTERIUM-LITHIUM HIGH FLUX NEUTRON SOURC
See NEUTRON SOURCE FACILITIES

DEUTERON REACTIONS
Capture
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
Quasi-Free Reactions
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
Stripping
Utilization of the reaction ^{10}B(d,n) ^{11}C as a high temperature deuterium plasma diagnostic, 8:34804 (J:US)

DEUTERON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET
DEUTERON REACTIONS

DEVELOPING COUNTRIES
See also BOLIVIA
BRAZIL
CHILE
ETHIOPIA
GUATEMALA
INDIA
ISRAEL
KENYA
MADAGASCAR
MEXICO
REPUBLIC OF KOREA
ROMANIA
TURKEY
UGANDA
VENEZUELA
Renewable Energy Sources
Commercial potential of passive solar energy technologies in the third world, 8:33482 (J:US)
Renewable energy resources in the developing countries, 8:33873 (RA:US)

DEVOLATILIZATION
Mathematical Models
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)

DEVONIAN SHALES
See BLACK SHALES

DI-2-ETHYLHEXYLPHOSPHORIC ACID
See HDEHP

DIAGNOSTIC TECHNIQUES
See also TOMOGRAPHY
Evaluation
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R:US)

DIAL PAINTERS
Biological Radiation Effects
Non-stochastic effects of ^{226}Ra and ^{228}Ra in the human skeleton, 8:34585 (R:US)

DIAMOND COUNTERS
See CRYSTAL COUNTERS

DIAPHRAGMS (THERMONUCLEAR DEVICE)
See LIMITERS

DIATOMS
Ultraviolet Radiation
Effect of UV-B radiation on the marine diatom Bellerochea yucatanensis, 8:34662 (RA:DE)

DICARBOXYLIC ACIDS
See also ADIPIC ACID
Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA:US)
Comparative Evaluations
Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems, 8:33051 (RA:US)

DIELECTRIC MATERIALS
Onsager Relations
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)

DIELECTRIC PROPERTIES
Computerized Simulation
Simulation of polar and polarizable fluids, 8:34742 (J:US)
Reviews
Simulation of polar and polarizable fluids, 8:34742 (J:US)

DIELECTRIC TRACK DETECTORS
Saturation effects in polycarbonates irradiated at high doses, 8:34360 (RA:IL)
Performance
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
Uses
Other possibilities of applying solid state track detectors in neutron dosimetry, 8:34373 (RA:CS:In Czech)

DIELECTRICS
See DIELECTRIC MATERIALS

DIESEL ENGINES
Noise Pollution Abatement
Reduction of noise emitted by medium-speed diesel engines by partial encasing, 8:33946 (R:DE:In German)

DIFFRACTION (NEUTRON)
See NEUTRON DIFFRACTION

DIFFUSION
Nernst-Einstein equation in high-defect-content solids, 8:34113 (J:GB)

DIGESTIVE SYSTEM DISEASES
Diagnosis
Clinical relevance of radioimmunologic gastrin determination for peptic ulcer, 8:34530 (R:DE:In German)
Pre-surgical radiologic diagnostics of pancreas diseases, 8:34521 (R:DE:In German)

DIMETHYL SULFOXIDE
See DMSO

DIMETHYLBENZANTHRACENE
Carcinogenesis
Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications, 8:34637 (J:US)
Resistance of germ-free athymic nude mice to two-stage skin carcinogenesis, 8:34644 (BA:US)
Toxicity
Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications, 8:34637 (J:US)

DIOLS
See GLYCOLS

DIPOLE MOMENTS
Pade Approximation
Rules for S(-2k) dipole sums, 8:34733 (J:DE)

DIRECT GAIN SYSTEMS
Prior to September 1980 HEAT GAIN was used to index this concept.
Design
Tabular data for the un-utilizability passive solar design method, 8:33460 (J:US)
Floors
Carpeted slab floors and comfort in direct gain systems, 8:33440 (J:US)
Performance
Passive solar retrofit: comparisons of computer simulated performance with monitored data, 8:33461 (J:US)
Passive Solar Masonry Workbook, 8:33488 (J:US)
Thermal performance of an earth-sheltered passive solar residence, 8:33423 (J:US)

Temperature Distribution
Graphic method for predicting temperature swings, 8:33456 (J:US)
Textiles
Test results: textiles selected for direct gain passive buildings, 8:33478 (J:US)
Thermal Insulation
Optimum conservation in direct gain homes: a new freedom for designers, 8:33504 (J:US)

DIRECTIONAL DRILLING
Cost
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA:US)
Drilling Equipment
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA:US)
Horizontal drilling for underground coal gasification, 8:32968 (RA:US)
Test Facilities
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)

DISCHARGES (ELECTRIC)
See ELECTRIC DISCHARGES

DISCHARGES (IONIZATION)
See IONIZATION

DISCHARGES (WASTES)
See WASTE DISPOSAL

DISINTEGRATION (FISSION)
See FISSION

DISPERSANTS (CHEMICAL)
See SURFACTANTS

DISPOSAL (WASTES)
See WASTE DISPOSAL

DISSOLVED GASES
Diffusion
Constant-flow ventilation of apneic dogs, 8:34569 (B:US)

DISSOLVED OXYGEN
See DISSOLVED GASES
OXYGEN

DISTILLATE FUEL
See HEATING OILS

DISTILLATE FUEL OIL
See HEATING OILS

DISTILLATES
Mutagen Screening
Improving coal-liquid quality by heavy-distillate recycle (Product boiling below 590°F), 8:32945 (R:US)
Recycling
Improving coal-liquid quality by heavy-distillate recycle (Product boiling below 590°F), 8:32945 (R:US)

DISTRIBUTION FUNCTIONS
Moments Method
Moment series for the coefficient of variation in Weibull sampling, 8:34978 (BA:US)

DISTRICT HEATING
Economics
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R:US)
Feasibility Studies
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R:US)
Waste Heat Utilization
Temperature booster of waste heat for room heating, 8:33937 (R:SE:In Swedish)
Water Source Heat Pumps
Saln 3.2 MW waste water heat pump measurements. Operation experiences. Report 1., 8:33903 (R:SE:In Swedish)

DISTRICT OF COLUMBIA
See WASHINGTON DC

DIVERTORS
Gas Flow
Axisymmetric scrape-off plasma transport, 8:34937 (R:US)
Sputtering
Charge state of sputtered impurity ions near a limiter or divertor in a tokamak, 8:34909 (R:US)

DMBA
See DIMETHYLBENZANTHRACENE

DMSO
Chemical Reactions
Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J:NL)

DNA
Biological Radiation Effects
Radiological physics and chemistry, 8:34195 (RA:US)
Biological Repair
DNA repair in a congeneic pair of mice with different longevities, 8:34605 (J:CH)
Effect of chemical carcinogens on mammalian cells in culture, 8:34619 (RA:US)
Isolation and characterization of yeast DNA repair genes, 8:34502 (RA:US)
uv excision-repair gene transfer in Chinese hamster ovary (CHO) cells, 8:34494 (R:US)
Biosynthesis
Effect of chemical carcinogens on mammalian cells in culture, 8:34619 (RA:US)
Cytological Techniques
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)
Physical Properties
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)
Strand Breaks
Role of DNA breakage in bacterial lethality caused by UV-B radiation, 8:34584 (RA:DE)

DORMITORIES
See RESIDENTIAL BUILDINGS

DOSEMETERS
See also ALBEDO-NEUTRON DOSEMETERS
Calibration
Facility for calibration of protection-level radiation instruments, 8:34363 (RA:IL)
Design
Development of a combined real-time neutron dosimeter in the 1 eV to 14 MeV energy region and a survey meter for high neutron dose rates, 8:34358 (RA:IL)
Energy Dependence
Energy dependence of some current personnel neutron dosemeters, 8:34366 (RA:CS:In Czech)
Performance Testing
Performance of the wide energy Rem response personnel neutron dosimeter, 8:34361 (RA:IL)
Response Functions
Directional dependence of the wide energy range Rem response personnel neutron dosimeter, 8:34359 (RA:IL)

DOSIMETERS
See DOSEMETERS

DOUBLE ENVELOPE BUILDINGS
Air Flow
Performance results of the Dennis Demmel double shell home, Hartington, Nebraska, 8:33424 (J:US)
Heat Storage
Performance results of the Dennis Demmel double shell home, Hartington, Nebraska, 8:33424 (J:US)
Monitoring
Thermal performance of the Peterson Residence: a double shell envelope house, 8:33422 (J:US)
Performance
Performance results of the Dennis Demmel double shell home, Hartington, Nebraska, 8:33424 (J:US)
Thermal performance of the Peterson Residence: a double shell envelope house, 8:33422 (J:US)

DOUBLE SHELL HOUSES
See DOUBLE ENVELOPE BUILDINGS

DOUBLE WALL HOUSES
See DOUBLE ENVELOPE BUILDINGS

DOUBLET 3 DEVICES
See DOUBLET REACTORS

DOUBLET REACTORS
RF Systems
Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R:US)

DOW PUSHER 700
See POLYAMIDES
DOWA PROCESS
Evaluation
Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA:US)
Flowsheets
Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA:US)
Testing
Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA:US)
DOWNHOLE INFORMATION SYSTEMS
See MWD SYSTEMS
DRAG EFFECT
See ELECTROPHORESIS
DRESDEN-2 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R:US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R:US)
DRESDEN-3 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R:US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Dresden Nuclear Power Station, Units 2 and 3, Docket Nos. 50-237, 50-249, 8:33769 (R:US)
DRILL BITS
Performance Testing
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
DRILL CORES
Chemical Reactions
Chemical exploration by computer, 8:33103 (J:GB)
Computer Calculations
Chemical exploration by computer, 8:33103 (J:GB)
Dynamic Loads
Velocities and dynamic moduli of five EE2 borehold samples: technical summary report, 8:33575 (RA:US)
Recovery
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
DRILL SHIPS
See OFFSHORE PLATFORMS
DRILLING PLATFORMS
See OFFSHORE PLATFORMS
DRILLING RIGS
Dynamic Loads
Stress of the drilling shaft in deep-well drilling, 8:33134 (R:DE:In German)
Shafts
Stress of the drilling shaft in deep-well drilling, 8:33134 (R:DE:In German)
DRINKING WATER
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)
DROPLETS
Hydrodynamics
The migration of fluid droplets and their interactions in a thermal gradient, 8:34741 (R:US)
DRY SCRUBBERS
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
Evaluation
Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal, 8:33045 (RA:US)
Performance Testing
Atomization: the key to dry scrubbing at the Coyote Station, 8:33049 (RA:US)
Dry scrubbing at Northern States Power Company, Riverside Generating Plant, 8:33048 (RA:US)
Research Programs
SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA:US)
Technology Assessment
Current status of dry SO_2 control systems (Spray drying, dry injection and limestone injection in a multistage burner), 8:33044 (RA:US)
DRY STORAGE
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R:US)
DTO
See HEAVY WATER
DUAL-PURPOSE POWER PLANTS
Operation
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
Planning
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
DUBNA SYNCHROCYCLOTRON
Construction
Present status of construction of the JINR high current phasotron ("F" facility), 8:34269 (RA:SU:In Russian)
Performance Testing
Present status of construction of the JINR high current phasotron ("F" facility), 8:34269 (RA:SU:In Russian)
DUCTS
Laminar Flow
Numerical computation of buoyancy-induced recirculation in curved square duct laminar flow, 8:34238 (J:GB)
Radiation Streaming
Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations, 8:34854 (R:US)
DUSTS
Inhalation
NRC's limit on intake of uranium-ore dust, 8:33247 (R:US)
Maximum Permissible Concentration
NRC's limit on intake of uranium-ore dust, 8:33247 (R:US)
DYMAC SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM
DYNAMIC LOADS
Calculation Methods
Methods of predicting loading and bending induced in an OTEC riser cable, 8:33367 (RA:US)
DYNAMIC MATERIALS ACCOUNTABILITY SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM

E

EARLY RADIATION INJURIES
See RADIATION INJURIES

EARTH BERMS
Performance
Thermal performance of an earth-sheltered passive solar residence, 8:33423 (J:US)
EARTH-COVERED BUILDINGS
Cooling
Earth coupled cooling techniques, 8:33918 (J:US)
Design
Earth coupled cooling techniques, 8:33918 (J:US)
Direct Gain Systems
Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California, 8:33518 (J:US)
Energy Conservation
Small houses in rocks. Preliminary study, 8:33896 (R:SE:In Swedish)
Heat Storage
Small houses in rocks. Preliminary study, 8:33896 (R:SE:In Swedish)
Indoor Air Pollution
Small houses in rocks. Preliminary study, 8:33896 (R:SE:In Swedish)
Passive Solar Cooling Systems
Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California, 8:33518 (J:US)
ECONOMIC ANALYSIS
Computer Calculations
PRP-4: an updated version of the discounted-cash-flow program PRP, 8:34964 (R:US)
ECONOMIC POLICY
Evaluation
Potential impact of the President's economic recovery plan on the electric-utility industry - with Commonwealth Edison Company serving as a case study, 8:33864 (R:US)
ECONOMY
Mathematical Models
Embedding energy industry into economy, 8:33792 (R:DE:In German)
ECR HEATING
Electron heating and superthermal electron enhancement due to electron cyclotron heating in ISX-B at 28 GHz, 8:34900 (R:US)
EDS LIQUEFACTION
See EXXON LIQUEFACTION PROCESS
EFFLUENTS (CHEMICAL)
See CHEMICAL EFFLUENTS
EFFLUENTS (GASEOUS)
See GASEOUS WASTES
EFFLUENTS (RADIOACTIVE)
See RADIOACTIVE EFFLUENTS
EFFUSION
See DIFFUSION
EGGS
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
EHV AC SYSTEMS
345-765 kV.
Gas-Insulated Cables
Voltage-time characteristics of breakdown in SF_6 (550 kV gas-insulated system), 8:33633 (RA:US)
Gas-Insulated Substations
Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA:US)
EIGENVALUES
Algorithms
Balancing the generalized eigenvalue problem, 8:34892 (J:US)
EINSTEIN GRAVITATION THEORY
See GENERAL RELATIVITY THEORY
EINSTEIN-DE SITTER MODEL
See COSMOLOGICAL MODELS
ELASTOMERS
Physical Radiation Effects
Effects of tritium in elastomers, 8:34015 (R:US)
ELECTRIC BATTERIES
Devices for production and/or storage of electrical energy from chemical reactions; excludes FUEL CELLS and RADIOISOTOPE BATTERIES.
See also LEAD-ACID BATTERIES
Molten Salts
Physical chemistry of molten-salt batteries. Final report, October 1, 1981-September 30, 1982. LiCl precipitation from LiCl-KCl anolyte in porous Li-Al electrodes, 8:33783 (R:US)
Precipitation
Physical chemistry of molten-salt batteries. Final report, October 1, 1981-September 30, 1982. LiCl precipitation from LiCl-KCl anolyte in porous Li-Al electrodes, 8:33783 (R:US)
ELECTRIC CABLES
See also GAS-INSULATED CABLES
Bending
Methods of predicting loading and bending induced in an OTEC riser cable, 8:33367 (RA:US)
Design
Developmental design status of riser cable systems for OTEC pilot plants, 8:33371 (RA:US)
Dynamic Loads
Methods of predicting loading and bending induced in an OTEC riser cable, 8:33367 (RA:US)
Installation
Study of ocean cableships applied to submarine power cable installation, 8:34259 (RA:US)
Manufacturing
Commercial aspects of OTEC power cable manufacture, 8:33383 (RA:US)
Constructability of submarine bottom cables for OTEC power transmission, 8:33384 (RA:US)
Materials Testing
Electrical/mechanical cable test machine design and operation, 8:33369 (RA:US)
Testing of OTEC riser cable components and models, 8:33368 (RA:US)
Testing of full scale prototype OTEC riser cables, 8:33370 (RA:US)
Safety
OTEC subsea electrical power cable protection systems and technology, 8:33372 (RA:US)
Test Facilities
Electrical/mechanical cable test machine design and operation, 8:33369 (RA:US)
Underwater
Study of ocean cableships applied to submarine power cable installation, 8:34259 (RA:US)
ELECTRIC CONTACTORS
See SWITCHES
ELECTRIC DISCHARGES
See also CORONA DISCHARGES
ELECTRIC SPARKS
Mathematical Models
Analytic formulation of electron distribution function from transport coefficients of electron swarm, 8:34701 (RA:US)
Pressure Dependence
Validity of streamer mechanism in compressed gases, 8:34703 (RA:US)
Simulation
Dielectric strength of electronegative gases in non-uniform field: role of the vibrational excitation, 8:34736 (RA:US)
ELECTRIC POWER
See also HYDROELECTRIC POWER
Bibliographies
Bibliography of the electric power industry of Wuerttemberg, 8:33869 (R:DE:In German)
Comparative Evaluations
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
Cost
Cost evolution of electric energy in Brazil, 8:33626 (RA:BR:In Portuguese)
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
Economic consequences of the delay in the nuclear energy developing programme in Baden-Wuerttemberg considering topical cost-analyses on the power generation sector, 8:33813 (R:DE:In German)

Energy Conservation
Energy report of the electrical industry, 8:33868 (R:DE:In German)
Forecasting
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)
Power Demand
Kilowatts from coal, 8:33023 (RA:US)
Prices
Comparing the effects of three nuclear power plants on future electricity prices, 8:33865 (R:US)
Regulations
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)

ELECTRIC POWER INDUSTRY
Use only for general papers that go beyond specific interests of the utility such as generation, transmission, rates, etc. and include one or more of the following: equipment manufacturers; educational or research activities; o
Data Acquisition Systems
Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C, 8:33863 (R:US)
Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C, 8:33862 (R:US)
Economic Growth
Potential impact of the President's economic recovery plan on the electric-utility industry - with Commonwealth Edison Company serving as a case study, 8:33864 (R:US)
Government Policies
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)
Information Validation
Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C, 8:33863 (R:US)
Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C, 8:33862 (R:US)
Regulations
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)

ELECTRIC POWER RESEARCH INSTITUTE
See EPRI

ELECTRIC POWER SYSTEMS
See POWER SYSTEMS

ELECTRIC SPARKS
Electric Currents
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA:US)

ELECTRIC SWITCHES
See SWITCHES

ELECTRIC UTILITIES
Swedish state power board, 8:33595 (RA:DE)
Accounting
Business report of the NWK 79: 1st October 1977 - 30th September 1978, 8:33941 (R:DE:In German)
Comparative Evaluations
Analysis of the disparity in electricity rates among electric utilities, 8:33619 (R:US)
Decision Making
Review of energy-supply-decision issues in the US electric utility industry, 8:33867 (R:US)
Economics
Analysis of the electric-utility industry in the US: an overview of selected analyses assessing the financial health of the utility industry, 8:33622 (R:US)
Energy Efficiency
Demonstrating energy-efficient developments, 8:33810 (J:US)
Foreign Policy
Characterization of foreign electric-utility experiences for potential useful applications in the US, 8:33621 (R:US)
Government Policies
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)
Land Use
Survey of spatial data needs and land use forecasting methods in the electric utility industry. Final Report, 8:34432 (R:US)
National Organizations
Demonstrating energy-efficient developments, 8:33810 (J:US)
Peak Load
Case studies of electric-generating-plant demographics: efficiency and availability enhancements, 8:33618 (R:US)
Planning
Review of energy-supply-decision issues in the US electric utility industry, 8:33867 (R:US)
Pricing Regulations
Comparison of the electric-utility industry with other major business sectors, 8:33620 (R:US)
Rate Structure
Analysis of the disparity in electricity rates among electric utilities, 8:33619 (R:US)
Analysis of the electric utility industry in the US: an assessment of the national and regional cost and rate impacts of restoring utility financial health, 8:33623 (R:US)
Regulations
Analysis of options for structural reform in electric-utility regulation. Report of the NGA Task Force on electric utility regulation, 8:33844 (R:US)
Power shortages and utility regulation: a discussion of the current policy debate. Final report, 8:33866 (R:US)
Risk Assessment
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)
System Failure Analysis
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)

ELECTRICAL BREAKDOWN
See ELECTRICAL FAULTS

ELECTRICAL FAULTS
Detection
Wideband digital correlator for partial discharge location in GIS, 8:33641 (RA:US)

ELECTRICAL INSULATION
Breakdown
Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA:US)
Transient breakdown in SF_6 gas-impregnated polymer film structures, 8:33648 (RA:US)
Design
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)
Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA:US)
Polymers
Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA:US)
Transient breakdown in SF_6 gas-impregnated polymer film structures, 8:33648 (RA:US)
Sulfur Fluorides
Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA:US)
Transient breakdown in SF_6 gas-impregnated polymer film structures, 8:33648 (RA:US)

ELECTRICAL INSULATORS
Corona Discharges
Surface discharge in SF_6, 8:33639 (RA:US)
Electric Charges
Charge accumulation on spacer surface at dc stress in compressed SF_6 gas, 8:33637 (RA:US)
Electric Fields
Electrostatic field evaluation by the electrolytic tank method, 8:33638 (RA:US)
Epoxides
Development of surface charges on epoxy resin spacers stressed with direct applied voltages, 8:33636 (RA:US)
Failures
Development of high gradient, high vacuum accelerator tubes at Daresbury, 8:34274 (BA:US)

Flashover
Development of surface charges on epoxy resin spacers stressed with direct applied voltages, 8:33636 (RA:US)
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Surface flashover of gas/solid interfaces, 8:33635 (RA:US)
Sulfur Fluorides
Surface discharge in SF_6, 8:33639 (RA:US)
ELECTRIC-POWERED VEHICLES
Control Equipment
Improved transistorized ac motor controller for battery powered urban electric passenger vehicles, 8:33951 (R:US)
Hydrogen Fuel Cells
Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA:US)
ELECTROCHEMISTRY
Data Analysis
Comparison of computer curve-fitting and graphical data evaluations of the galvanostatic relaxation technique for the measurement of kinetics of electrode reactions, 8:34176 (J:GB)
Nonaqueous Solvents
Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$, 8:34173 (R:DE:In German)
Optimization
Recent advances in optimization strategies: chromatography, electrochemistry, and spectroscopy, 8:34071 (J:US)
ELECTRODEPOSITION
Surfactants
Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R:US)
ELECTRODES
Chemical Composition
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)
Coatings
Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA:US)
Configuration
Effect of grounded enclosure on the field distribution of rod-plane gaps, 8:34867 (RA:US)
Negative polarity dc breakdown of rod/plane gaps up to 1 MV, as affected by protrusions from the plane, 8:33634 (RA:US)
ELECTROLYTIC CELLS
Thermodynamics
Zirconia fuel cells and electrolyzers, 8:33885 (BA:US)
ELECTROMAGNETIC FILTERS
Design
Development of electromagnetic filter for removing suspended material from water circuit, 8:33725 (RA:CS:In Czech)
ELECTROMAGNETS
See also BEAM BENDING MAGNETS
BEAM FOCUSING MAGNETS
SUPERCONDUCTING MAGNETS
Performance Testing
LBL Magnetic-Measurements Data-Acquisition System, 8:34314 (R:US)
ELECTROMIGRATION
See ELECTROPHORESIS
ELECTRON ACCEPTOR
See ELECTRONS
ELECTRON BEAMS
Beam Bunchers
Electron-beam buncher to operate over the frequency range 1-4 GHz, 8:34285 (R:US)
Beam Splitting
Four-way rf beam separator, 8:34293 (R:US)
Beam Transport
Simple method for damping transverse motion of a high intensity electron beam, 8:34294 (R:US)
ELECTRON COLLISIONS
See also ELECTRON-ATOM COLLISIONS
Elastic Scattering
Elastic scattering data for electrons in attaching gases, 8:34698 (RA:US)
Spin Orientation
Scattering of polarized low-energy electrons by ferromagnetic metals, 8:34721 (RA:BR)
ELECTRON CONFIGURATION (ATOMS)
See ELECTRONIC STRUCTURE
ELECTRON CYCLOTRON-RESONANCE HEATING
See ECR HEATING
ELECTRON DONOR
See ELECTRONS
ELECTRON MICROSCOPY
Accuracy
Propagation of errors in quantitative AEM microanalysis by XEDS and EELS, 8:34084 (BA:US)
Corrections
Geometry of the absorption correction for analytical microscopy, 8:34083 (BA:US)
Energy Losses
Quantal aspects of the spatial resolution of energy-loss measurements in electron microscopy. I. Broad-beam geometry, 8:34073 (J:GB)
Quantification of energy loss measurements with the use of K and L absorption edges, 8:34075 (BA:US)
MeV Range 01-10
Life beyond 1 MeV, 8:34388 (BA:US)
ELECTRON SOURCES
Specifications
"Electron-5" high-voltage electron accelerator, 8:34265 (RA:SU:In Russian)
ELECTRON SPECTROMETERS
Position Sensitive Detectors
High efficiency electron spectrometer for atomic collision physics research, 8:34354 (RA:US)
ELECTRON-ATOM COLLISIONS
Elastic Scattering
Spin polarization effects in low-energy elastic electron scattering, 8:34723 (R:NL)
ELECTRONIC CIRCUITS
See also GATING CIRCUITS
Computer-Aided Design
Electronics engineer's design station, 8:34252 (J:US)
ELECTRONIC DATA PROCESSING
See DATA PROCESSING
ELECTRONIC EQUIPMENT
See also POWER SUPPLIES
Reliability
Component reliability as experienced by manufacturer of electronic assemblies, 8:34241 (R:US)
Seismic Effects
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R:US)
Standards
Guide for compliance with television receiver reporting and testing program requirements (21 CFR 1002.10 and 1002.12) - revision. Report for Mar 77-Aug 82, 8:34860 (R:US)
ELECTRONIC STRUCTURE
For electron configuration in atoms and molecules, and electron band structure in solids.
See also K SHELL
Computer Calculations
Supercomputer requirements for theoretical chemistry, 8:34168 (J:US)
ELECTRONICS (QUANTUM)
See QUANTUM ELECTRONICS
ELECTRON-POSITRON INTERACTIONS
Annihilation
Quark fragmentation and the determination of α/sub s/, 8:34756 (R:US)
ELECTRONS
See also SOLVATED ELECTRONS
Particle Identification
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R:US)
Scavenging
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J:NL)

Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34193 (J:NL)
Synchrotron Radiation
Use of synchrotron radiation for electron identification at high luminosity, 8:34353 (R:US)
ELECTROPHORESIS
Flow Models
Flow and thermal effects in continuous flow electrophoresis, 8:34237 (R:US)
Temperature Effects
Flow and thermal effects in continuous flow electrophoresis, 8:34237 (R:US)
ELECTROSTATIC ACCELERATORS
See also TANDEM ELECTROSTATIC ACCELERATORS
VAN DE GRAAFF ACCELERATORS
Beam Currents
High current multi-megavolt ion accelerators, 8:34278 (BA:US)
Electric Potential
Accelerator design for 50 MV, 8:34279 (BA:US)
Meetings
Electrostatic accelerator technology, 8:34324 (B:US)
Neutron Sources
Development and investigation of small-sized unsoldered accelerating tubes for a neutron laser generator, 8:34310 (RA:SU:In Russian)
Specifications
"Electron-5" high-voltage electron accelerator, 8:34265 (RA:SU:In Russian)
Uses
Application of accelerators for solution of the national economy problems, 8:34266 (RA:SU:In Russian)
Why higher energies, 8:34349 (BA:US)
ELECTROSTATIC LENSES
Comparative Evaluations
Transport in rectangular quadrupole channels, 8:34281 (R:US)
Quadrupoles
Transport in rectangular quadrupole channels, 8:34281 (R:US)
ELECTROSTATIC WAVES
See PLASMA WAVES
ELLIPSOMETERS
Design
Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R:US)
ELMO BUMPY TORUS
Neoclassical Transport Theory
Resonant ion transport in EBT, 8:34901 (R:US)
Radioactivation
Neutron activation in EBT-P, 8:34912 (R:US)
Shielding
EBT-P gamma-ray-shielding analysis, 8:34922 (R:US)
EMBRYONIC CELLS
Nuclear Magnetic Resonance
New method for the study of energy metabolism in living cells using nuclear magnetic resonance, 8:34506 (RA:US)
Oncogenic Transformations
New method for the study of energy metabolism in living cells using nuclear magnetic resonance, 8:34506 (RA:US)
EMBRYOS
Sarcomas
Anomolous inability of Rous sarcoma virus to cause tumors in avian embryos, 8:34560 (RA:US)
EMERGENCY PLANS
NRC Incident-Response Plan, 8:33751 (R:US)
EMISSION SPECTROSCOPY
Uses
Inductively coupled plasma atomic emission spectroscopy: a review, 8:34080 (J:US)
EMPLOYEES
See PERSONNEL
ENCAPSULATION
Silicone encapsulant development for fireset applications, 8:34017 (R:US)
END USE SECTOR
See INDUSTRY
ENDF
See NUCLEAR DATA COLLECTIONS
ENERGY
See also GEOTHERMAL ENERGY
NUCLEAR ENERGY
SOLAR ENERGY
Meetings
Proceedings of the Second Brazilian Congress of Energy, 8:34951 (R:BR:PT)
Research Programs
Non-governmental research and development investments in selected energy technologies. Summary report, 8:33804 (R:US)
ENERGY CONSERVATION
Comparative Evaluations
Comparative analysis of conservation and passive solar strategies in multi-family residences, 8:33445 (J:US)
Conservation and passive solar: a performance comparison in Washington State, 8:33444 (J:US)
Economics
Energy savings and conservation, 8:33823 (J:AT)
Feasibility Studies
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
Health Hazards
Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R:US)
Research Programs
Energy R and D in Sweden, 8:33805 (R:SE)
ENERGY CONSUMPTION
See also FUEL CONSUMPTION
Comparative Evaluations
Energistic '81, 8:33870 (R:DE:In German)
Energy Models
Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report, 8:33798 (R:US)
ENERGY DEMAND
Data Acquisition
Analyzing industrial energy demand: organization and analysis of information, 8:33826 (R:US)
Energy Models
Model documentation: Short-Term Integrated Forecasting System Demand Model, 8:33855 (R:US)
Forecasting
Long range energy demand (Seven world regions and Sweden), 8:33794 (R:SE:In Swedish)
Model documentation: Short-Term Integrated Forecasting System Demand Model, 8:33855 (R:US)
Global Aspects
Long range energy demand (Seven world regions and Sweden), 8:33794 (R:SE:In Swedish)
Information Retrieval
Analyzing industrial energy demand: organization and analysis of information, 8:33826 (R:US)
Mathematical Models
Long range energy demand (Seven world regions and Sweden), 8:33794 (R:SE:In Swedish)
ENERGY EFFICIENCY
Research Programs
Demonstrating energy-efficient developments, 8:33810 (J:US)
Technology Transfer
Demonstrating energy-efficient developments, 8:33810 (J:US)
ENERGY INFORMATION ADMINISTRATION
Information Needs
Review of electric-power data requirements. Volume II. Appendices. Final report of Union Carbide subcontract No. 62X-04166C, 8:33863 (R:US)
Review of electric-power data requirements. Volume I. Technical report. Final report of Union Carbide subcontract No. 62X-04166C, 8:33862 (R:US)
ENERGY MODELS
Model documentation: Short-Term Integrated Forecasting System Demand Model, 8:33855 (R:US)
Data Acquisition
MEDEE 3: first results for Ireland and data collection. Final report, 8:33791 (R:XE)

ENERGY POLICY
Future of synthetic fuels: a congressional view, 8:33861 (RA:US)
Legal Aspects
Catalogue of possible energy policy measures, 8:33848 (R:CH:In German)
Nigeria
Nigeria - energy situation 1981, 8:33839 (R:DE:In German)
ENERGY SHORTAGES
Political Aspects
Future of synthetic fuels: a congressional view, 8:33861 (RA:US)
ENERGY SOURCE DEVELOPMENT
Economic Impact
Report on biomass energy, 8:33322 (R:US)
Environmental Impacts
Report on biomass energy, 8:33322 (R:US)
Planning
Texas Energy and Natural Resources Advisory Council activities and accomplishments. Annual report, 8:33860 (R:US)
ENERGY SOURCES
See also FOSSIL FUELS
NUCLEAR FUELS
RENEWABLE ENERGY SOURCES
WOOD FUELS
Forecasting
Energy of tomorrow. Description of techniques and appraisement of the future, 8:33807 (R:SE:In Swedish)
Planning
STOSEB 80. Regional energy plan, 8:33828 (R:SE:In Swedish)
World's energy sources - possibilities and limits, 8:33803 (R:DE:In German)
Technology Assessment
Energy of tomorrow. Description of techniques and appraisement of the future, 8:33807 (R:SE:In Swedish)
ENERGY SUPPLIES
Research Programs
Energy of tomorrow. Description of techniques and appraisement of the future, 8:33807 (R:SE:In Swedish)
Energy R and D in Sweden, 8:33805 (R:SE)
Reviews
Energy of tomorrow. Description of techniques and appraisement of the future, 8:33807 (R:SE:In Swedish)
ENERGY-LEVEL DENSITY
Applied uses of nuclear level densities, 8:34824 (R:US)
ENGINEERING
Computer Codes
MEGA (Mechanical Engineering General Analysis) user's document, 8:34967 (R:US)
ENGLAND
See UNITED KINGDOM
ENHANCED RECOVERY
See also MICROBIAL EOR
Bilateral Agreements
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)
Coordinated Research Programs
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
Data Base Management
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
Evaluation
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Field Tests
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R:US)
Research Programs
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R:US)
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Steam Generation
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)
ENRICHMENT (ISOTOPIC)
See ISOTOPE SEPARATION
ENTOMOLOGY
See INSECTS
ENVELOPE HOUSES
See DOUBLE ENVELOPE BUILDINGS
ENVIRONMENT
Monitoring
Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report, 8:34455 (R:US)
ENVIRONMENTAL IMPACTS
This descriptor is to be used to describe the possible effects on the environment from a proposed project.
Environmental monitoring report for calendar year 1982, 8:34935 (R:US)
ENVIRONMENTAL POLICY
Cost Benefit Analysis
Cost/benefit analysis: environmental protection projects, 8:34461 (RA:US)
Implementation
PCB compliance, assessment, and spill control guide, 8:34439 (R:US)
Reviews
Environmental laws and regulations: potential changes, 8:34419 (RA:US)
ENVIRONMENTAL PROTECTION AGENCY
See US EPA
ENVIRONMENTAL TRANSPORT
See also RADIONUCLIDE MIGRATION
Mathematical Models
Advanced fossil energy program, 8:34452 (RA:US)
Computerized methodology for evaluating the long-range radiological impact of shallow-land burial, 8:33195 (RA:US)
Toxic substances program, 8:34453 (RA:US)
EOR
See ENHANCED RECOVERY
EPA
See US EPA
EPITHELIUM
Cell Cultures
Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications, 8:34637 (J:US)
Pathological Changes
Dark cells in human oral leukoplakias, 8:34566 (J:DK)
Transplants
Propagation of normal human epithelial cell populations using an in vivo culture system: description and applications, 8:34637 (J:US)
EPOXIDES
Biological Effects
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)

Breakdown
Deterioration of epoxy mold insulations due to voltage endurance, 8:34014 (RA:US)
Dielectric Properties
Deterioration of epoxy mold insulations due to voltage endurance, 8:34014 (RA:US)
EPOXY COMPOUNDS
See EPOXIDES
EPRI
Research Programs
EPRI joins reactor project, 8:33811 (J:US)
How power options stack up, 8:33812 (J:US)
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)
Technology Assessment
How power options stack up, 8:33812 (J:US)
EPSTEIN-BARR VIRUS
See ONCOGENIC VIRUSES
EQUATIONS OF STATE
Algorithms
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
ERBIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
ERBIUM 167
Hyperfine Structure
Relativistic many-body theory of atomic structures, 8:34720 (R:US)
EROSION
Erosion of metal alloys and their scales, 8:33978 (BA:US)
Land Pollution Abatement
There's more to erosion control than protecting the pipe, 8:33164 (R:US)
Meetings
Corrosion-erosion-wear of materials in emerging fossil-energy systems, 8:33976 (B:US)
ERYTHROCYTES
Cell Proliferation
Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA:US)
Kinetics
Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA:US)
ERYTHROPOIESIS
Dose-Response Relationships
Regulation of red blood cell production in human beings by erythropoietin, 8:34477 (RA:US)
ERYTHROPOIETIN
Biochemistry
Erythropoietin studies: purification from urine and production of monoclonal antibodies, 8:34480 (RA:US)
Regulation of red blood cell production in human beings by erythropoietin, 8:34477 (RA:US)
Chemical Preparation
Erythropoietin studies: purification from urine and production of monoclonal antibodies, 8:34480 (RA:US)
ESCHERICHIA COLI
Ultraviolet Radiation
Role of DNA breakage in bacterial lethality caused by UV-B radiation, 8:34584 (RA:DE)
ESTERS
Includes esters of organic and inorganic acids.
See also NITRIC ACID ESTERS
PHORBOL ESTERS
PHOSPHOLIPIDS
Isomerization
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Radiolysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Structural Chemical Analysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
ESTUARIES
Wave Propagation
Wave motion in an estuary, 8:33578 (R:DE:In German)
ESTUARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
ETHANAL
See ACETALDEHYDE
ETHANE
Adsorption Isotherms
Gas-solid chromatography of ethane on activated carbon at 25°C, 8:34163 (J:NL)
Decomposition
Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J:NL)
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
1,2-ETHANEDIOL
See GLYCOLS
ETHANOL
Biosynthesis
Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R:US)
Dielectric Properties
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)
Ignition
Experimental and analytical investigation of high temperature ignition of ethanol, 8:33274 (R:US)
ETHANOL FUELS
Use for pure ethanol, ethanol-water mixtures, or ethanol with additives; for ethanol-gasoline mixtures, use GASOHOL.
Economic Analysis
Fuel ethanol from agricultural crops. A review, 8:33349 (R:DK)
ETHIOPIA
Energy Policy
Policy issues in Ethiopian energy development, 8:33320 (R:SE)
Energy Sources
Policy issues in Ethiopian energy development, 8:33320 (R:SE)
Planning
Policy issues in Ethiopian energy development, 8:33320 (R:SE)
ETHOCEL
See CELLULOSE
ETHYL ALCOHOL
See ETHANOL
ETHYLALDEHYDE
See ACETALDEHYDE
ETHYLENE
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
ETHYLENE GLYCOL
See GLYCOLS
EURATOM
Inspection
Problems of non-proliferation and nuclear safeguards, 8:34470 (R:DE:In German)
EUROPE
See also WESTERN EUROPE
Air Quality
Composition of the aerosol of a clean air region. Final report, 8:34399 (R:SE:In Swedish)

Energy Consumption
Preliminary studies on the period 1975-1980: applications of the multinational model EURECA). Final report, 8:33798 (R:US)

EUROPEAN ATOMIC ENERGY COMMUNITY
See EURATOM

EUROPIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Distribution Functions
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
Solvent Extraction
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)

EUROPIUM 151
Moessbauer Effect
Conversion electron Moessbauer spectroscopy of europium-151 and thulium-169, 8:34832 (J:GB)

EUROPIUM COMPOUNDS
Absorption Spectra
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
Electrochemistry
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)

EVALUATED NUCLEAR DATA FILE
See NUCLEAR DATA COLLECTIONS

EXCISION REPAIR
See BIOLOGICAL REPAIR

EXCITATION
Reviews
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)

EXCITATION FUNCTIONS
Computer Calculations
Semiempirical calculation of excitation functions, 8:34828 (J:US)

EXCRETION ANALYSIS
See PERSONNEL MONITORING

EXHAUST GASES
Recycling
Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R:US)

EXPERIMENTAL FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES

EXPLOSIONS
Evaluation
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R:NO)

EXTENDED PARTICLE MODEL
See also STRING MODELS
Schwinger Functional Equations
Non-existence of extended physical states in the Schwinger model, 8:34770 (R:XA)
Solitons
Geon-type solutions of the non-linear Heisenberg-Klein-Gordon equation, 8:34768 (R:XA)

EXTRACTION COLUMNS
Fabrication
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases, 8:34086 (J:DE)

EXTRAHIGH VOLTAGE ALTERNATING CURRENT SYS
See EHV AC SYSTEMS

EXXON DONOR SOLVENT LIQUEFACTION
See EXXON LIQUEFACTION PROCESS

EXXON LIQUEFACTION PROCESS
Erosion
Erosion experience at the EDS coal liquefaction pilot plant, 8:33001 (BA:US)

EYE CATARACTS
See CATARACTS

EYES
See also RETINA
Delayed Radiation Effects
Cataract production in mice by fractionated doses of ^{12}C particles or ^{60}Co gamma radiation, 8:34598 (RA:US)

F

FABRIC FILTERS
Performance Testing
Dry scrubbing at Northern States Power Company, Riverside Generating Plant, 8:33048 (RA:US)

FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES

FACILITIES (NUCLEAR)
See NUCLEAR FACILITIES

FACILITIES (RESOURCE RECOVERY)
See RESOURCE RECOVERY FACILITIES

FACILITIES (TEST)
See TEST FACILITIES

FALLOUT PARTICULATES
See PARTICLES

FARADAY GENERATORS
See MHD GENERATORS

FARM EQUIPMENT
Electric-Powered Vehicles
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R:US)
Energy Consumption
Technical and economic feasibility of electric tractors in US agriculture, 8:33933 (R:US)

FARMS
Fuel Substitution
Logging residue as fuelwood in forest farmers houses, 8:33344 (R:SE:In Swedish)

FAST BREEDER TYPE REACTORS
See FBR TYPE REACTORS

FAST NEUTRONS
Radiobiology
Fast neutron radiotherapy: fundamental aspects and clinical results, 8:34558 (J:US)
Radiotherapy
Fast neutron radiotherapy: fundamental aspects and clinical results, 8:34558 (J:US)
Tissue-Equivalent Detectors
Experimentals on the energy-deposition of fast neutrons in phantoms, 8:34534 (R:DE:In German)

FAST REACTORS
See also FBR TYPE REACTORS
Reactor Core Disruption
Fission gas effects in fast reactor disassembly, 8:33776 (B:GB)
Reactor Physics
Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J:US)

FAST-MIXED SPECTRUM REACTOR
See FBR TYPE REACTORS

FATTY ACIDS
See CARBOXYLIC ACIDS

FBR TYPE REACTORS
See also LMFBR TYPE REACTORS
Fuel Cycle
User's guide for the REBUS-3 fuel cycle analysis capability, 8:33701 (R:US)

FEDERAL REGION V
Prior to June 1982 this concept was indexed to GREAT LAKES REGION.
See also ILLINOIS
INDIANA
MICHIGAN
MINNESOTA
OHIO
WISCONSIN
Air Pollution Abatement
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 3. Federal Regions V and VII, 8:33800 (R:US)

FEDERAL REGION VII
Prior to June 1982 this concept was indexed to MIDWEST REGION.
See also IOWA
KANSAS
MISSOURI
NEBRASKA
Air Pollution Abatement
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 3. Federal Regions V and VII, 8:33800 (R:US)
FEDERAL REPUBLIC OF GERMANY
Economic Policy
Interdependence between energy supply and the economy as a whole as an economic problem, 8:33851 (R:DE:In German)
Electric Power
Energy report of the electrical industry, 8:33868 (R:DE:In German)
Electric Power Industry
Bibliography of the electric power industry of Wuerttemberg, 8:33869 (R:DE:In German)
Energy Analysis
Analysis and evaluation of energy forecasting for the Federal Republic of Germany. Vol. 2, 8:33827 (R:DE:In German)
Energy Policy
Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission, 8:33847 (R:DE:In German)
Nuclear Energy
Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission, 8:33847 (R:DE:In German)
Wind
High time resolution wind data and the dynamic production function of WECS, 8:33586 (RA:DE)
FEDERAL WATER POLLUTION CONTROL ACT
See CLEAN WATER ACT
FEEDWATER HEATERS
Corrosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Erosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
FEMALE GENITALS
Biomedical Radiography
Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R:DE:In German)
FERMENTATION ALCOHOL
See ETHANOL
FERMIONS
See also LEPTONS
Feynman Path Integral
Ambiguities of functional integrals for fermionic systems, 8:34870 (R:XA)
Spin
Limitations on quantum measurements II: Analysis of a model example, 8:34871 (R:XA)
Limitations of quantum measurements I: Determination of the minimal amount of non-ideality and identification of the optimal measuring apparatuses, 8:34869 (R:XA)
FERRIC COMPOUNDS
See IRON COMPOUNDS
FERRITE
Sorptive Properties
Process for removal of heavy-metal ions from waste water (Japanese patent), 8:33944 (TG:US)
FERROCENE
Redox Potential
Bridged ferrocenes. VII. Correlation of redox potentials with structure, 8:34130 (J:NL)
FERROUS COMPOUNDS
See IRON COMPOUNDS
FEYNMAN PATH INTEGRAL
WKB Approximation
Ambiguities of functional integrals for fermionic systems, 8:34870 (R:XA)
FIBERGLASS
Corrosion Resistance
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
Fire Resistance
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
FIBROBLASTS
Biological Radiation Effects
Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells, 8:34593 (RA:US)
FIBROSIS
Radiotherapy
Radiotherapy of breast fibrosis, 8:34516 (R:DE:In German)
FIELDS (MAGNETIC)
See MAGNETIC FIELDS
FINANCIAL MANAGMENT
See PROGRAM MANAGEMENT
FINGERPRINTING (OIL SPILLS)
See OIL SPILLS
FIRE EXTINGUISHERS
Documentation
Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires, 8:33145 (R:NO)
FIRE FIGHTING
Protective Clothing
Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82, 8:34666 (R:US)
FIRE STATIONS
See PUBLIC BUILDINGS
FIREDAMP
See METHANE
FIRES
Evaluation
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R:NO)
FIREWOOD
See WOOD FUELS
FIRST WALL
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Design
INTOR impurity control and first wall system, 8:34910 (R:US)
Lifetime
Lifetime analysis of fusion-reactor components, 8:34919 (R:US)
Physical Radiation Effects
Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Reviews
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
Surface Coating
First-wall-coating candidates for ICF reactor chambers using dry-wall protection only, 8:34913 (R:US)
FISCHER-TROPSCH SYNTHESIS
Catalysts
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R:US)
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
Chemical Reaction Kinetics
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Research Programs
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
FISH CULTURE
See FISHERIES

FISH HATCHERIES
See FISHERIES
FISHERIES
Prior to August 1981, this concept was indexed to AQUACULTURE.
Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83, 8:33156 (R:US)
FISHES
Population Dynamics
Aquatic ecology section, 8:34454 (RA:US)
Values
Monetary values of freshwater fish and fish-kill counting guidelines, 8:33802 (J:US)
FISSION
Computer Calculations
JULIAN II. A code for multiple-chance fission and multi-step particle and gamma ray emission in compound nuclear reactions, 8:33718 (RA:IL)
FISSION FRAGMENT DETECTION
Ionization Chambers
New fission fragment detectors for cross section and angular distribution measurements at CBNM, 8:34382 (J:US)
FISSION PRODUCT RELEASE
Coordinate with descriptors for the area of release such as BIOSPHERE or COOLANTS, and for the specific fission products, if known.
Quantitative Chemical Analysis
Routine apparatus for marine ^{85}Kr-samples, 8:34468 (R:DE:In German)
FISSIONABLE MATERIALS MANAGEMENT
See NUCLEAR MATERIALS MANAGEMENT
FLAME SPECTROMETRY
See EMISSION SPECTROSCOPY
FLANGES
Testing
Remotely handled vacuum flange connections (ZEPHYR experiment), 8:34927 (R:DE:In German)
FLASH HYDROPYROLYSIS PROCESS
Short-residence-time hydropyrolysis of coal. Final technical report, 1 October 1979-30 November 1982, 8:32948 (R:US)
Research Programs
Flash pyrolysis of coal with reactive and non-reactive gases. Progress report, October 1, 1981-September 30, 1982 (Yields in various gases and conditions), 8:32946 (R:US)
Yields
Flash pyrolysis of coal with reactive and non-reactive gases. Progress report, October 1, 1981-September 30, 1982 (Yields in various gases and conditions), 8:32946 (R:US)
FLASKS
See CASKS
FLAVONES
See also QUERCETIN
Absorption Spectroscopy
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Luminescence
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Ultraviolet Spectra
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
FLAVORDYNAMICS
See QUANTUM FLAVORDYNAMICS
FLORIDA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
FLOWMETERS
Calibration
Calibration of and conversion charts for Matheson rotameters, 8:34387 (R:US)
Recommendations
UCG test facility design criteria and evaluation, 8:32964 (RA:US)
FLUE GAS
Denitrification
DOE's electron beam irradiation development program, 8:33036 (RA:US)
Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R:US)
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan (Electrostatic precipitation, limestone-gypsum flue gas desulfurization, catalytic reduction of nitrogen oxides), 8:33035 (RA:US)
Spray dryer/electron beam removal of SO_2 and NO/sub x/ from flue gas. First technical progress report, 1 October 1981-1 October 1982, 8:33020 (R:US)
Desulfurization
Atomization: the key to dry scrubbing at the Coyote Station, 8:33049 (RA:US)
Buffer additives for limestone scrubbing: a review of R and D results, 8:33037 (RA:US)
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA:US)
Continuous emission monitoring of flue gas desulfurization systems, 8:34398 (RA:US)
Current status of dry SO_2 control systems, 8:33044 (RA:US)
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
DOE's electron beam irradiation development program, 8:33036 (RA:US)
Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility, 8:33032 (RA:US)
Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal, 8:33045 (RA:US)
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Dry scrubbing at Northern States Power Company, Riverside Generating Plant, 8:33048 (RA:US)
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
FGD chemistry and water integration, 8:33033 (RA:US)
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station (Dual alkali flue gas desulfurization), 8:33027 (RA:US)
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
Full-scale utility flue gas desulfurization system characterization results, 8:33034 (RA:US)
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Kilowatts from coal, 8:33023 (RA:US)
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)
Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA:US)
Materials of construction problems at Pleasants Power Station, 8:33029 (RA:US)
Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems, 8:33051 (RA:US)

Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R:US)
Proven reagent for high sulfur coal flue gas desulfurization, 8:33053 (RA:US)
Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA:US)
Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers, 8:33038 (RA:US)
Selection and use of alloys for flue gas desulfurization systems, 8:33960 (RA:US)
Simultaneous removal of SO_2 and particulates from flue gas, 8:33054 (RA:US)
SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA:US)
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan (Electrostatic precipitation, limestone-gypsum flue gas desulfurization, catalytic reduction of nitrogen oxides), 8:33035 (RA:US)
Spray dryer/electron beam removal of SO_2 and NO/sub x/ from flue gas. First technical progress report, 1 October 1981-1 October 1982, 8:33020 (R:US)
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)
Trends in commercial application of FGD technology, 8:33024 (RA:US)
Utilization of FGD by-product gypsum, 8:33043 (RA:US)

Heating
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R:DE:In German)

Heat Exchangers
Development of heat exchangers for reheating scrubbed flue gas in a pilot plant, 8:33616 (R:DE:In German)

Materials
Materials of construction problems at Pleasants Power Station, 8:33029 (RA:US)

Purification
Bal 2 process, 8:33088 (R:SE:In Swedish)

FLUID POISON CONTROL

Cost Benefit Analysis
Cost-benefit analysis of application of H_3BO_3 thermal regeneration in WWER type reactors, 8:33678 (RA:CS:In Czech)

FLUIDIZED BED

Design
Dynamics of bubbles and entrained particles in the rotating fluidized bed, 8:34239 (J:US)
Fluidized-bed design for ICF reactor blankets using solid-lithium compounds, 8:34914 (R:US)

Performance
Dynamics of bubbles and entrained particles in the rotating fluidized bed, 8:34239 (J:US)

FLUIDIZED-BED COMBUSTION

Chemical Reactions
Thermochemistry of fluidized-bed atmospheres, 8:33090 (BA:US)

Corrosion
Morphology of corrosion of advanced heat exchanger materials in simulated FBC deposits, 8:33091 (BA:US)

Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983, 8:33087 (R:NL)

FLUIDIZED-BED COMBUSTORS

Corrosion
Consideration of a possible mechanism for the corrosion of high temperature components in atmospheric coal fired fluidized bed combustors, 8:33092 (BA:US)

Efficiency
Carbon utilization in fluidized-bed combustion systems, 8:34256 (R:US)

Erosion
Erosion and erosion-corrosion in fluidized bed combustor systems, 8:33093 (BA:US)
Erosion/corrosion of superalloy test coupons exposed to PFB coal combuster effluent (IN-792, U-700, TAZ-8A), 8:33982 (BA:US)

Mathematical Models
Modeling of fluidized-bed combustion of coal. Volume IV. AFBC transient models. Final report, 8:33086 (R:US)

Oxygen Meters
Development of a technique for measuring oxygen partial pressures within a fluidized bed, 8:33095 (BA:US)

Research Programs
The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983, 8:33087 (R:NL)

FLUIDS
Not for BODY FLUIDS.
See also GASES
GEOTHERMAL FLUIDS
LIQUIDS

Dielectric Properties
Simulation of polar and polarizable fluids, 8:34742 (J:US)

Interfaces
Existence criteria for fluid interfaces in the absence of gravity, 8:34738 (R:US)

Light Scattering
Simulation of polar and polarizable fluids, 8:34742 (J:US)

Weightlessness
Existence criteria for fluid interfaces in the absence of gravity, 8:34738 (R:US)

FLUORANTHENE
See CONDENSED AROMATICS

FLUORINATED ALIPHATIC HYDROCARBONS

Chemical Reaction Kinetics
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)

Chemical Reactions
Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons, 8:34209 (J:US)

Excited States
Radiotracer studies of unimolecular energy transfer, 8:34186 (J:US)

Hot Atom Chemistry
Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons, 8:34209 (J:US)

Photolysis
Radiotracer studies of unimolecular energy transfer, 8:34186 (J:US)

FLUORINE

Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)

FLUORINE 18

Chemical Reactions
Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons, 8:34209 (J:US)

Hot Atom Chemistry
Chemical reactions of nuclear recoil ^{18}F atoms with gas-phase halocarbons, 8:34209 (J:US)
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)

Positron Computed Tomography
Improved sampling in positron emission tomography, 8:34546 (RA:US)
Positron imaging studies in Alzheimer-type dementia, 8:34543 (RA:US)

Tissue Distribution
^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo, 8:34508 (J:GB)

Uptake
^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo, 8:34508 (J:GB)

FLUORINE 19 TARGET
Oxygen 18 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
FLUORINE 23
Search for new isotopes at Brookhaven, 8:34809 (J:US)
FLUORINE COMPOUNDS
Electron Collisions
Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_6F_6), 8:34699 (RA:US)
Ionization
Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_6F_6), 8:34699 (RA:US)
FLUORINE FLUORIDES
See FLUORINE
FLUORINE IONS
Lamb Shift
Laser spectroscopy with fast heavy ion beams, 8:34717 (RA:US)
FLUORITE
Prospecting
Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R:DE:In German)
FLUOROURACILS
Tissue Distribution
^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo, 8:34508 (J:GB)
Uptake
^{18}F-5-fluorouridine: a new probe for measuring the proliferation of tissue in vivo, 8:34508 (J:GB)
FLUX (NEUTRON)
See NEUTRON FLUX
FLY ASH
Bulk Density
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Chemical Composition
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Compression Strength
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Desulfurization
Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal, 8:33045 (RA:US)
Electric Conductivity
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Leaching
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Particle Size
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Permeability
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Toxicity
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Uses
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Waste Processing
Evaluation of alternatives for treatment of PGDP steam plant fly ash, 8:33018 (RA:US)
Waste Product Utilization
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
FLYWHEELS
Composite Materials
Composite flywheels: status and performance assessment and projections, 8:33779 (R:US)
Performance
Composite flywheels: status and performance assessment and projections, 8:33779 (R:US)
FMC DOUBLE ALKALI PROCESS
Flowsheets
Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility, 8:33032 (RA:US)
Performance Testing
Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility, 8:33032 (RA:US)
FOILS
Thinner than PLATES or SHEETS.
Graphite
Differences of amorphous and graphitized carbon foils in their stripper qualities, 8:34338 (BA:US)
Performance
Comparative performance of stripper foils in the Argonne FN tandem, 8:34339 (BA:US)
Production
Submicron, unbacked, shaped metal foils, 8:33962 (R:US)
FOLIAGE
See LEAVES
FOOD CHAINS
Contamination
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
Health effects associtated with unit radonuclide releases to the environment, 8:33249 (RA:US)
FORESTRY
Field Tests
Energy forestry in the north of Sweden, 8:33336 (R:SE:In Swedish)
Meetings
Rationalization conference, 1981. Logging research foundation, 8:33343 (R:SE:In Swedish)
Research Programs
Joint IEA/IUFRO forestry energy workshop, 8:33338 (R:SE)
Soils
Distribution of organic matter, carbon and plant nutrients in soil in the early phase after clearcutting of a scots pine forest; with and without removal of logging slash, 8:33345 (R:SE)
FORMALDEHYDE
Photolysis
Question of mode-specificity in unimolecular reaction dynamics, 8:34178 (R:US)
Toxicity
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)
Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R:US)
FORMALIN
See FORMALDEHYDE
FORMALITH
See FORMALDEHYDE
FORMAMIDE
Genetic Effects
Tier II mutagenic screening of 13 NIOSH priority compounds: individual compound report, n,n-dimethylformamide, 8:34634 (R:US)
Photoemission
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J:NL)
FORMIC ALDEHYDE
See FORMALDEHYDE
FORMOL
See FORMALDEHYDE
FOSSIL FUEL RESERVES
See FOSSIL FUELS
FOSSIL FUELS
See also COAL
NATURAL GAS
OIL SANDS
OIL SHALES
PEAT

PETROLEUM
Non-governmental research and development investments in selected energy technologies. Summary report, 8:33804 (R:US)
Environmental Effects
Modulation of fossil fuel production by global temperature variations, 8:33843 (J:GB)
Production
Modulation of fossil fuel production by global temperature variations, 8:33843 (J:GB)
Research Programs
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
FOSSIL-FUEL POWER PLANTS
Ashes
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Boilers
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)
Coal
Kilowatts from coal, 8:33023 (RA:US)
Corrosion
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
Economics
Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants, 8:33624 (R:US)
Flue Gas
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Continuous emission monitoring of flue gas desulfurization systems, 8:34398 (RA:US)
Double alkali flue gas desulfurization retrofit on an industrial cogeneration facility, 8:33032 (RA:US)
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
FGD chemistry and water integration, 8:33033 (RA:US)
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Full-scale DAFGD experience at Central Illinois Public Service Company's Newton Station, 8:33027 (RA:US)
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
Full-scale utility flue gas desulfurization system characterization results, 8:33034 (RA:US)
Kilowatts from coal, 8:33023 (RA:US)
Laboratory and field evaluation of materials for flue gas desulfurization systems, 8:33028 (RA:US)
Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA:US)
Materials of construction problems at Pleasants Power Station, 8:33029 (RA:US)
Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R:US)
Simultaneous removal of SO_2 and particulates from flue gas, 8:33054 (RA:US)
Health Hazards
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Peak Load
Case studies of electric-generating-plant demographics: efficiency and availability enhancements, 8:33618 (R:US)
Pollution Control Equipment
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)
Rate Structure
Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants, 8:33624 (R:US)
FOWL
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
FRACTURES
Orientation
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
FRAGMENTS (PARTICLES)
See PARTICLES
FRANCE
Energy Policy
Energy industry of France 1981, 8:33830 (R:DE:In German)
Energy Supplies
Energy industry of France 1981, 8:33830 (R:DE:In German)
Land Use
Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report, 8:33308 (R:US)
FREE RADICALS
See RADICALS
FREONS
Breakdown
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
Electron Attachment
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
FRESH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
FRUITS
Limited to edible matured plant ovaries and accessory structures.
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
FUEL ASSEMBLIES
See also FUEL ELEMENT CLUSTERS
Heterogeneous Effects
Thermal reactor analysis for PWR fuel assemblies containing control rods, 8:33671 (RA:IL)
Homogenization Methods
Assembly homogenization in TDB, 8:33715 (RA:IL)
FUEL BUNDLES
See FUEL ELEMENT CLUSTERS
FUEL CELL POWER PLANTS
For commercial, residential, or electric utility use.
Demonstration Plants
4.8-MW fuel-cell demonstrator. Final report, 8:33883 (R:US)
Design
Advanced fuel-cell concepts for the 0.1- to 100-MW range, 8:33882 (R:US)
FUEL CELLS
See also ACID ELECTROLYTE FUEL CELLS
HIGH-TEMPERATURE FUEL CELLS
HYDROGEN FUEL CELLS
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
FUEL CONSUMPTION
Comparative Evaluations
Energistic '81, 8:33870 (R:DE:In German)
FUEL COOLING INSTALLATIONS
See SPENT FUEL STORAGE
FUEL CYCLE
See also PLUTONIUM RECYCLE
User's guide for the REBUS-3 fuel cycle analysis capability, 8:33701 (R:US)
Research Programs
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)

Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R:US)

FUEL ELEMENT CLUSTERS

Heat Transfer

Freon Rig design for performing heat transfer experiments for nuclear reactors fuel bundles, 8:33670 (RA:BR:In Portuguese)

Heterogeneous Effects

Thermal reactor analysis for cluster geometries, 8:33717 (RA:IL)

FUEL ELEMENTS

See also FUEL PINS
FUEL SPHERES
SPENT FUEL ELEMENTS

Crack Propagation

Transverse cracks in irradiated metal fuel element, 8:33728 (RA:IL)

Post-Irradiation Examination

Examination system of irradiated metallic fuel elements, 8:33729 (RA:IL)

Transverse cracks in irradiated metal fuel element, 8:33728 (RA:IL)

FUEL FABRICATION PLANTS

Environmental Impact Statements

Environmental impact appraisal for renewal of Special Nuclear Material License No. SNM-1168. Docket No. 70-1201, 8:33181 (R:US)

Environmental Impacts

Environmental impact appraisal for renewal of Special Nuclear Material License No. SNM-1168. Docket No. 70-1201, 8:33181 (R:US)

FUEL GAS

See also HIGH BTU GAS
NATURAL GAS

Calorific Value

Status of the Rawlins UCG-SDB program, 8:32971 (RA:US)

Chemical Composition

Influence of pressure-swinging on the simulation of underground coal gasification (10 bar constant pressure vs pressure variation between 7.5 bar and 1.2 bar in a 20 minute cycle in a large autoclave), 8:32984 (RA:US)

Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)

Cost

Economic comparison for UCG processes (Rawlins II; steeply dipping vs. horizontal beds), 8:32972 (RA:US)

Desulfurization

Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982, 8:32952 (R:US)

Environmental Transport

Subsurface detection of retort gases from an underground coal gasification reactor in steeply dipping beds near Rawlins, Wyoming, 8:32979 (RA:US)

Gas Analysis

UCG test facility design criteria and evaluation, 8:32964 (RA:US)

Hot Gas Cleanup

Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982, 8:32952 (R:US)

Market

Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)

Colorado lignite for underground coal gasification, 8:32983 (RA:US)

UCG-SDB, where do we go from here, 8:32988 (RA:US)

Methanation

Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)

Pressure Control

UCG test facility design criteria and evaluation, 8:32964 (RA:US)

Prices

Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)

Purification

Cleanup of UCG product gas (Scrubbing vs. reductive incineration), 8:32973 (RA:US)

Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)

Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)

UCG-SDB, where do we go from here, 8:32988 (RA:US)

Synthesis

Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1, 8:33270 (J:US)

Uses

Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)

FUEL MANAGEMENT

Proposed fuel management scheme for once-through PWR with 20% enrichment, 8:33672 (RA:IL)

FUEL OILS

See also HEATING OILS

Biological Effects

Effects of the water soluble fractions of oil from the tanker Sefir on the myside, Neonmysis integer, 8:33152 (R:SE)

Combustion

Bal 2 process, 8:33088 (R:SE:In Swedish)

FUEL PELLETS

Levitation

Generation of a strong core-centering force in a submillimeter compound droplet system, 8:34911 (R:US)

FUEL PENCILS

See FUEL PINS

FUEL PINS

Performance Testing

Status of steady-state irradiation testing of mixed-carbide fuel designs (LMFBR), 8:33689 (R:US)

FUEL REPROCESSING PLANTS

See also IDAHO CHEMICAL PROCESSING PLANT

Photometers

Evaluation of fiber optics for in-line photometry in hostile environments, 8:33185 (J:US)

FUEL SLURRIES

Chemical Preparation

Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R:US)

Flowmeters

Coal-liquid mixtures. A technical study, 8:33084 (R:SE:In Swedish)

Heating

Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R:US)

Pumps

Coal-liquid mixtures. A technical study, 8:33084 (R:SE:In Swedish)

FUEL SPHERES

Matrix Materials

Graphitic matrix materials for spherical HTR fuel elements, 8:33685 (R:DE:In German)

FUEL SUBSTITUTION

Economic Analysis

Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)

Feasibility Studies

Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)

FUEL SUSPENSIONS

See FUEL SLURRIES

FUELS

See also AUTOMOTIVE FUELS
BOILER FUELS
FOSSIL FUELS
FUEL SLURRIES
LIQUID FUELS
NUCLEAR FUELS

REFUSE DERIVED FUELS
SYNTHETIC FUELS
THERMONUCLEAR FUELS
WOOD FUELS

Atomization
Mechanisms of smoke reduction in the high-pressure combustion of emulsified fuels. Volume II. Experimental and theoretical study of evaporating emulsified and neat fuel sprays. Annual progress report No. 2, 29 September 1980-29 September 1981, 8:34210 (R:US)

FUELS (NUCLEAR)
See NUCLEAR FUELS

FUELWOOD
See WOOD FUELS

FUMES
See AEROSOLS

FUNGI
Genetic Control
Gene level control, 8:34565 (BA:US)
Genetics
Nuclear controls: discussant's introduction, 8:34564 (BA:US)
Morphological Changes
Nuclear controls: discussant's introduction, 8:34564 (BA:US)

FUNGICIDES
Chemical Properties
Fungicide treatment for cooling tower redwood, 8:33239 (RA:US)

FURNACE OIL
See HEATING OILS

FURNACES
See also BLAST FURNACES
WOOD BURNING FURNACES
Design
Specifications and design of a laminar-flow isothermal drop tube furnace for studies of pulverized fuel combustion., 8:33089 (R:SE)
Efficiency
Development of a high efficiency warm-air furnace using heat-pipe principles, 8:33891 (R:US)
Heat Pipes
Development of a high efficiency warm-air furnace using heat-pipe principles, 8:33891 (R:US)
Market
Development of a high efficiency warm-air furnace using heat-pipe principles, 8:33891 (R:US)

FUSION FUELS
See THERMONUCLEAR FUELS

FUSION (MELTING)
See MELTING

FUSION REACTORS
See THERMONUCLEAR REACTORS

G

GADOLINIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)

GADOLINIUM 149
High Spin States
Transition from collective to noncollective rotation at high spin in N ≃ 87 nuclei, 8:34831 (R:US)

GALAXY NUCLEI
Central part of galaxies.
Mathematical Models
Origin of relativistic particles and gamma-rays in quasars, 8:34686 (R:US)

GALLIUM ARSENIDES
Annealing
Damage annealing behavior of Se implanted GaAs, 8:34045 (J:GB)
Ion Implantation
Damage annealing behavior of Se implanted GaAs, 8:34045 (J:GB)

GAMMA DETECTION
Spark Chambers
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon, 8:34687 (R:BR:In several languages)

GAMMA DOSIMETRY
Thermoluminescent Dosemeters
Application of TL evaluation equipment in personnel dosimetry - type NHZ-203 imported from Hungary, 8:34369 (RA:CS:In Czech)
Effect of annealing on sensitivity of some thermoluminescent dosemeters to ^{60}Co gamma radiation, 8:34367 (RA:CS:In Slovak)

GAMMA FUNCTION
Algorithms
Complete guide to gamma variate generation, 8:34971 (J:US)

GAMMA HEATING
See RADIATION HEATING

GAMMA RADIATION
Cosmic Ray Flux
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon, 8:34687 (R:BR:In several languages)
Production
Gamma-ray production cross sections for MeV neutrons, 8:34827 (J:US)

GAMMA SPECTRA
Spectra Unfolding
Comparison of some computerized methods for gamma spectra interpretation, 8:34540 (RA:SU:In Russian)
Tables
Thermal neutron capture gamma-rays, 8:34789 (R:US)

GAMMA SPECTROMETERS
See also PAIR SPECTROMETERS
Calibration
Calibration of semiconductor gamma spectrometer by means of limited number of energy standards, 8:34473 (RA:SU:In Russian)

GAMMA SPECTROSCOPY
Li-Drifted Ge Detectors
Use of Ge(Li) spectrometry in monitoring personnel and environment. I, 8:34368 (RA:CS:In Czech)
Sensitivity
Sensitivity limits in gamma-ray spectroscopy, 8:34374 (RA:CS)

GAMMA-GAMMA LOGGING
Corrections
Computer program for borehole compensation of dual-detector density well logs, 8:34389 (R:US)

GARDENING
Input-Output Analysis
Food and fuel: round two (Comparison of input/output ratios for attached greenhouse vs commercial acreage), 8:33521 (J:US)

GAS CHROMATOGRAPHY
Comments on column characterization: a sulfur column, 8:34069 (J:DE)
Extraction Columns
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases, 8:34086 (J:DE)

GAS COOLANTS
See GASES

GAS LASERS
See also HELIUM-NEON LASERS
Ion Beams
Heavy ion beam pumped He-Ar, He-Xe, and Ar-Xe gas lasers, 8:34228 (RA:US)
Pumping
Heavy ion beam pumped He-Ar, He-Xe, and Ar-Xe gas lasers, 8:34228 (RA:US)

GAS TURBINE ENGINES
Composite Materials
High temperature composites. Status and future directions, 8:34010 (R:US)

Materials
Development of ceramic automobile turbine engine components, 8:33947 (R:DE:In German)
Thermal Insulation
Thermal barrier coatings, 8:34005 (BA:US)

GAS TURBINES
Design
Large industrial gas turbine for medium and peak load service, 8:33617 (R:DE:In German)
Fuels
Mechanisms of smoke reduction in the high-pressure combustion of emulsified fuels. Volume II. Experimental and theoretical study of evaporating emulsified and neat fuel sprays. Annual progress report No. 2, 29 September 1980-29 September 1981, 8:34210 (R:US)
Peak Load
Large industrial gas turbine for medium and peak load service, 8:33617 (R:DE:In German)
Performance
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine, 8:33948 (R:US)
Temperature Dependence
Flow process in combustors, 8:34233 (R:US)
Turbulent Flow
Flow process in combustors, 8:34233 (R:US)
Vortex Flow
Flow process in combustors, 8:34233 (R:US)

GAS WELLS
See NATURAL GAS WELLS

GASEOUS EFFLUENTS
See GASEOUS WASTES

GASEOUS WASTES
See also EXHAUST GASES
FLUE GAS
Diffusion
Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks, 8:34415 (R:US)
Environmental Effects
Advanced fossil energy program, 8:34452 (RA:US)
Gas Chromatography
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R:AT:In German)

GASES
See also ELECTRON GAS and FERMI GAS.
See also AIR
DISSOLVED GASES
EXHAUST GASES
FUEL GAS
PYROLYTIC GASES
RARE GASES
SYNTHESIS GAS
Breakdown
Sparking potentials calculated from the electron-molecule collision properties of gases, 8:34705 (RA:US)
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Charged-Particle Transport
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
Dielectric Properties
Gaseous dielectrics III, 8:34020 (R:US)
Some problems associated with the use of small scale measurements in determining the dielectric strength of insulating gases, 8:34050 (BA:US)
Electric Discharges
Analytic formulation of electron distribution function from transport coefficients of electron swarm, 8:34701 (RA:US)
Electron Collisions
Elastic scattering data for electrons in attaching gases, 8:34698 (RA:US)
Particulates
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)

GAS-INSULATED CABLES
Electrical Insulators
Electrostatic field evaluation by the electrolytic tank method, 8:33638 (RA:US)
Fabrication
Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA:US)
Polypropylene
Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA:US)
Sulfur Fluorides
Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA:US)
Voltage-time characteristics of breakdown in SF_6 (550 kV gas-insulated system), 8:33633 (RA:US)

GAS-INSULATED SUBSTATIONS
Circuit Breakers
Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA:US)
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)
Corona Discharges
Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA:US)
Design
77kV new type all-in-one SF_6 gas-insulated switchgear, 8:33647 (RA:US)
Electrical Faults
Wideband digital correlator for partial discharge location in GIS, 8:33641 (RA:US)
Electrical Insulation
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)
Epoxides
Deterioration of epoxy mold insulations due to voltage endurance, 8:34014 (RA:US)
Overvoltage
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)
Performance Testing
Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA:US)
Reliability
77kV new type all-in-one SF_6 gas-insulated switchgear, 8:33647 (RA:US)
Experiences in maintaining the quality of gas insulated equipment in the field and their feedback to the design and the manufacturing processes, 8:33645 (RA:US)
Spark Gaps
Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing, 8:33642 (RA:US)
Sulfur Fluorides
Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA:US)
Study on metal fluoride products formation caused by the electric arc in SF_6, 8:34039 (RA:US)
Thermal decomposition of SF_6 and SF_6-air mixtures in substation environments, 8:34038 (RA:US)
Switches
Effect of restriking spark on dielectric strength to ground in a model gas insulated disconnecting switch, 8:33646 (RA:US)
Transients
Fast transient overvoltages in GIS caused by the operation of isolators, 8:33643 (RA:US)

GAS-INSULATED TRANSFORMERS
Electrical Insulation
Partial discharge and breakdown studies in model gas transformer windings, 8:34040 (RA:US)
Transient breakdown in SF_6 gas-impregnated polymer film structures, 8:33648 (RA:US)

GASOHOL
Previous to August, 1979 this concept was indexed as gasoline AND mixtures AND ethanol or methanol.
Combustion Products
Determination of methyl nitrite in automobile exhaust gases, 8:33276 (R:SE:In Swedish)
GASOLINE
Cost
Updating of costs for production of methanol from natural gas and vacuum residue feedstock, 8:33160 (R:SE)
GASOLINE PLANTS
Economic Analysis
Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA:US)
GATING CIRCUITS
Design
Developing a gate-array capability at a research and development laboratory, 8:34251 (R:US)
Testing
Developing a gate-array capability at a research and development laboratory, 8:34251 (R:US)
GE(LI) DETECTORS
See LI-DRIFTED GE DETECTORS
GENERAL RELATIVITY THEORY
Testing
Possibility of a fourth test of general relativity in earth's gravitational field, 8:34873 (R:XA)
GENERATORS (PULSE)
See PULSE GENERATORS
GENERATORS (STEAM)
See STEAM GENERATORS
GENITALS (FEMALE)
See FEMALE GENITALS
GEOCHEMICAL SURVEYS
Activation Analysis
Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R:DE:In German)
Multi-Element Analysis
Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R:DE:In German)
X-Ray Fluorescence Analysis
Application of energy dispersive X-ray fluorescence, ion-sensitive electrodes and instrumental neutron activation in geochemical prospecting, 8:34674 (R:DE:In German)
GEOLOGY
Meetings
Seminar on nuclear methods in mining, geology, geophysics, and geochemistry. Abstracts of papers, 8:34675 (R:CS)
GEOMETRY
Meetings
Conference on differential geometric methods in theoretical physics, 30 June - 3 July 1981. Extended abstracts, 8:34890 (R:XA)
GEOPRESSURED SYSTEMS
Program Management
Report of the Energy Research Advisory Board Geopressured Resources Subpanel of the Geothermal Panel, 8:33550 (R:US)
Resource Development
Report of the Energy Research Advisory Board Geopressured Resources Subpanel of the Geothermal Panel, 8:33550 (R:US)
GEORGIA
Coastal Waters
Benthic enrichment in the Georgia Bight related to Gulf Stream intrusions and estuarine outwelling, 8:34509 (J:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
GEOTHERMAL AREAS
See GEOTHERMAL FIELDS
GEOTHERMAL ENERGY
Government Policies
Report of the Energy Research Advisory Board Direct Heat Subpanel of the Geothermal Panel, 8:33551 (R:US)
Market
Report of the Energy Research Advisory Board Direct Heat Subpanel of the Geothermal Panel, 8:33551 (R:US)
GEOTHERMAL FIELDS
See also GEYSERS GEOTHERMAL FIELD
Seismic Surveys
Seismic reflection investigation of structural and lithologic parameters in the area of the Urach geothermal anomaly, 8:33554 (R:DE:In German)
GEOTHERMAL FLUIDS
Solvent Properties
Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C, 8:33577 (R:US)
GEOTHERMAL HEATING
Program Management
Report on DOE's direct heat program, 8:33566 (R:US)
GEOTHERMAL HEATING SYSTEMS
Cost
Low-enthalpy geothermal energy for local heating. Final report, 8:33567 (R:XE:FR)
Feasibility Studies
Low-enthalpy geothermal energy for local heating. Final report, 8:33567 (R:XE:FR)
Operation
Low-enthalpy geothermal energy for local heating. Final report, 8:33567 (R:XE:FR)
GEOTHERMAL POWER PLANTS
Condensers
Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site, 8:33565 (R:US)
GEOTHERMAL REGIONS
See GEOTHERMAL FIELDS
GEOTHERMAL RESOURCES
Resource Potential
Report of the Energy Research Advisory Board Direct Heat Subpanel of the Geothermal Panel, 8:33551 (R:US)
GEOTHERMAL WELLS
Testing
Geothermal Exploratory-Well Project: city of Alamosa, Colorado. Final report, September 1980-April 1983, 8:33556 (R:US)
Well Drilling
Geothermal Exploratory-Well Project: city of Alamosa, Colorado. Final report, September 1980-April 1983, 8:33556 (R:US)
GERMAN FEDERAL REPUBLIC
See FEDERAL REPUBLIC OF GERMANY
GERMANIUM ARSENIDES
Phase Studies
Phase stability and microstructural characteristics of bulk glassy CdGe/sub 1-x/Si/sub x/As_2 alloys, 8:34047 (J:GB)
GERMANY (FEDERAL REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY
GERMS (MICROORGANISMS)
See MICROORGANISMS
GETTERS
Materials used for the purification of vacuum atmospheres; see also the specific materials.
Pumping
Getter pumping speed measurements in the range 10^{-2} to 10^{-7} liters per second, 8:33262 (R:US)
GEYSERS GEOTHERMAL FIELD
Microearthquakes
Seismic monitoring at The Geysers Geothermal Field, California, 8:33553 (R:US)
Seismology
Seismic monitoring at The Geysers Geothermal Field, California, 8:33553 (R:US)

GIANT CELLS
See TUMOR CELLS
GLANDS
See also MAMMARY GLANDS
Delayed Radiation Effects
Induction of Harderian gland tumors in mice by heavy ion irradiation, 8:34597 (RA:US)
GLASS
See also BOROSILICATE GLASS
Chemical Radiation Effects
Effect of radiolysis on leachability of plutonium and americium from 76-101 glass (Glass containing 2 mole % plutonium), 8:34042 (R:US)
Ionic Conductivity
Ionic conductivity and the weak electrolyte theory of glass, 8:34144 (J:NL)
Leaching
Effect of radiolysis on leachability of plutonium and americium from 76-101 glass (Glass containing 2 mole % plutonium), 8:34042 (R:US)
Structural Models
Ionic conductivity and the weak electrolyte theory of glass, 8:34144 (J:NL)
GLASS INDUSTRY
Occupational Diseases
Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R:US)
GLASS MELTERS
See CERAMIC MELTERS
GLAUBER'S SALT
See SODIUM SULFATES
GLAZING MATERIALS
Transparent or translucent materials such as glass or glass substitutes.
Destructive Testing
Vandal resistance properties of solar glazing materials, 8:33544 (J:US)
GLUCOSE
Metabolism
New method for the study of energy metabolism in living cells using nuclear magnetic resonance, 8:34506 (RA:US)
GLUEBALLS
Glueballs in the reaction $\pi^- p \rightarrow$ phi phi n, 8:34746 (R:US)
GLUONIUM
See GLUEBALLS
GLYCOLS
Biological Effects
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)
GOLD ALLOYS
Crystal Field
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R:US)
Muon Probes
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R:US)
GOVERNMENT POLICIES
See also ECONOMIC POLICY
ENERGY POLICY
ENVIRONMENTAL POLICY
Recommendations
Analysis of options for structural reform in electric-utility regulation. Report of the NGA Task Force on electric utility regulation, 8:33844 (R:US)
GRAIN ALCOHOL
See ETHANOL
GRANITES
Crack Propagation
Microcrack formation and hysteresis under hydrostatic cycling, 8:33574 (RA:US)
Cracks
Microcrack formation and hysteresis under hydrostatic cycling, 8:33574 (RA:US)
Deformation
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
Dynamic Loads
Elberton granite: a compendium of velocities, dynamic moduli and related physical properties, 8:33576 (RA:US)
Velocities and dynamic moduli of five EE2 borehold samples: technical summary report, 8:33575 (RA:US)
Fluid Flow
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Magnetic Susceptibility
Relation of well-log velocities and magnetic susceptibilities to laboratory value: Conway granites, White Mountains, New Hampshire, 8:33555 (RA:US)
Physical Properties
Elberton granite: a compendium of velocities, dynamic moduli and related physical properties, 8:33576 (RA:US)
Porosity
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Thermal Stresses
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
GRAPHITE
Chemical Reaction Kinetics
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Compression Strength
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Corrosion
REACT/THERMIX - a computer code to calculate graphite corrosion due to accidents in pebble-bed reactors, 8:33747 (R:DE:In German)
Fracture Mechanics
Dependence of strength on particle size in graphite, 8:34049 (BA:US)
Materials Testing
Graphitic matrix materials for spherical HTR fuel elements, 8:33685 (R:DE:In German)
Oxidation
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Radiolysis
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
GRAPHITE MODERATOR
See GRAPHITE
GRASS
Harvesting Equipment
Reed harvesting Koeping, 8:33335 (R:SE:In Swedish)
GRASSLANDS
See RANGELANDS
GRAVITATION
Field Equations
Approximate solution with torsion for a charged particle in a gauge theory of gravitation, 8:34874 (R:XA)
Some aspects of gravitational waves in an isotropic background universe, 8:34876 (R:XA)
Semiclassical Approximation
Recursive formula for the evaluation of <psi'T-circumflexsub(μnu)(x)'psi> and its application in the semi-classical theory of gravity, 8:34875 (R:XA)
GRAVITATIONAL WAVE DETECTORS
Interferometers
Gravitational wave detection by laser interferometry, 8:34882 (R:DE)

GRAVITATIONAL WAVES
Wave Equations
Some aspects of gravitational waves in an isotropic background universe, 8:34876 (R:XA)
GREAT BRITAIN
See UNITED KINGDOM
GREAT LAKES REGION
See FEDERAL REGION V
GREENHOUSES
See also ATTACHED GREENHOUSES
Energy Conservation
Energy conservation measures for quonset type greenhouses in cold climates, 8:33523 (J:US)
Passive Solar Heating Systems
Passive solar greenhouse retrofits: a precursor to an integrated biomass conversion system, 8:33524 (J:US)
Performance
Revised renewable resource calculation procedures for the RCS program, 8:33410 (R:US)
GROSS-NEVEU MODEL
See LAGRANGIAN FIELD THEORY
GROUND DISPOSAL
Air Pollution
Emission of mercury from an ash disposal, 8:33063 (R:SE:In Swedish)
GROUND MOTION
Environmental Effects
Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany, 8:33065 (R:DE:In German)
GROUND SOURCE HEAT PUMPS
Worldwide applications of ground-coupled heat pumps, conventional and solar assisted, 8:33890 (R:US)
GROUND SUBSIDENCE
Simulation
Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion (Hanna II and Hoe Creek), 8:32976 (RA:US)
GROUND WATER
Chemical Composition
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R:US)
Monitoring
Effect of UCG on groundwater: a study of cavity and surrounding groundwater, 8:33069 (RA:US)
Groundwater quality in underground coal gasification: a regulatory outlook, 8:33068 (RA:US)
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R:US)
Oxygen 18
$^{18}O/^{16}O$ ratio in groundwater of the Federal Republic of Germany, 8:34667 (R:DE:In German)
Radionuclide Migration
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
GETOUT: a computer code for one-dimensional analytical solution for radionuclide transport, 8:33242 (R:US)
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Leaching behavior of monazite, 8:33217 (RA:IL)
MMT: a random-walk one-dimensional multicomponent mass-transport code, 8:33241 (R:US)
Radionuclide transport code development in support of nuclear waste storage investigations, 8:33245 (R:US)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA:US)
Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA:US)
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA:US)
Sampling
Groundwater quality in underground coal gasification: a regulatory outlook, 8:33068 (RA:US)
Sensible Heat Storage
Heat storage in ground water, 8:33821 (R:SE:In Swedish, English)
Tracer Techniques
Institute for Radiohydrometry - annual report 1980, 8:34441 (R:DE:In German)
Water Chemistry
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Water Pollution
Effect of UCG on groundwater: a study of cavity and surrounding groundwater, 8:33069 (RA:US)
Water Quality
Ground water, 8:34459 (RA:US)
Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R:SE:In Swedish)
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R:US)
GROUND-WATER RESERVES
See AQUIFERS
GROUTING
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)
Phase Studies
Characterization of hydrofracture grouts for radionuclide migration, 8:33196 (R:US)
GUATEMALA
Energy Sources
Energy industry of Guatemala 1981, 8:33829 (R:DE:In German)
GUNDREMMINGER KRB REACTOR
See RWE-BAYERNWERK REACTOR
GYPSUM
Waste Product Utilization
Utilization of FGD by-product gypsum, 8:33043 (RA:US)

H

HADRON REACTIONS
Diffraction Models
Diffraction scattering of strongly bound system, 8:34755 (R:DE)
HADRON-HADRON INTERACTIONS
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
Diffraction Models
Diffraction scattering of strongly bound system, 8:34755 (R:DE)
Quantum Chromodynamics
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R:US)
HADRONS
See also MESONS
Electromagnetic Interactions
General and nuclear physics, 8:34763 (R:UA)
Quantum Chromodynamics
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R:US)
Wave Functions
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R:US)
HALDEN HEAVY BOILING WATER REACTOR
See HBWR REACTOR
HALL GENERATORS
See MHD GENERATORS

HALOGENATED ALICYCLIC HYDROCARBONS
Electronic Structure
Negative ion states of polyatomic molecules, 8:34169 (J:US)
HALOGENATED ALIPHATIC HYDROCARBONS
See also BROMINATED ALIPHATIC HYDROCARBONS
CHLORINATED ALIPHATIC HYDROCARBONS
FLUORINATED ALIPHATIC HYDROCARBONS
FREONS
IODINATED ALIPHATIC HYDROCARBONS
Electronic Structure
Negative ion states of polyatomic molecules, 8:34169 (J:US)
HALOGENATED AROMATIC HYDROCARBONS
See also CHLORINATED AROMATIC HYDROCARBONS
Electronic Structure
Negative ion states of polyatomic molecules, 8:34169 (J:US)
HAM
See MEAT
HANDLING (DATA)
See DATA PROCESSING
HANFORD ATOMIC PRODUCTS OPERATION
See HAPO
HANFORD RESERVATION
Environment
Environmental surveillance at Hanford for CY 1982, 8:34435 (R:US)
Environmental Effects
Ground water, 8:34459 (RA:US)
Radiation Monitoring
Atmospheric monitoring, 8:34418 (RA:US)
Radioactive Waste Disposal
Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site, 8:33244 (R:US)
Radioactivity
Penetrating radiation, 8:34430 (RA:US)
Radiological impact of Hanford operations, 8:34431 (RA:US)
Radioecology
Environmental surveillance at Hanford for CY 1982, 8:34435 (R:US)
HAPO
Radioactive Waste Management
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
HARD COAL
See BLACK COAL
HARD FACING
Wear Resistance
Abrasion in multiphase alloys, 8:34003 (BA:US)
HARD SURFACING
See HARD FACING
HARVESTING
Economic Analysis
Biomass, 8:33353 (RA:US)
Environmental Effects
Biomass, 8:33353 (RA:US)
HARVESTING EQUIPMENT
Cost
Harvesting wood for energy, 8:33356 (R:US)
Performance
Harvesting wood for energy, 8:33356 (R:US)
Performance Testing
Reed harvesting Koeping, 8:33335 (R:SE:In Swedish)
Recommendations
Rationalization conference, 1981. Logging research foundation, 8:33343 (R:SE:In Swedish)
HASTELLOY C-276
See HASTELLOYS
HASTELLOY C-4
See HASTELLOYS
HASTELLOYS
Corrosion
Materials problem: operating a closed-loop limestone FGD system (Hastelloy G, Hastelloy C-276), 8:33025 (RA:US)
Selection and use of alloys for flue gas desulfurization systems, 8:33960 (RA:US)
Surface Coating
Materials problem: operating a closed-loop limestone FGD system (Hastelloy G, Hastelloy C-276), 8:33025 (RA:US)
HAWAII
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
HAZARDOUS MATERIALS
Not for radioactive materials.
Waste Management
Hazardous waste management alternatives utilized at the PGDP, 8:33192 (RA:US)
Regulation of solid wastes from coal-gasification and -liquefaction facilities: an analysis of Federal and selected state hazardous-waste management programs under RCRA, 8:33021 (R:US)
HBWR REACTOR
Mixed Oxide Fuels
Irradiation behaviour of UO_2/PuO_2 mixed oxide fuel in the experiments IFA 427 and IFA 428 in the Halden boiling water reactor, 8:33687 (R:DE:In German)
HCDA
See REACTOR CORE DISRUPTION
HD 8077
See NICKEL BASE ALLOYS
HDEHP
Reaction Kinetics
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
Thermodynamic Activity
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
HDO
See HEAVY WATER
HE-3 COUNTERS
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
HEALTH PHYSICS
See RADIATION PROTECTION
HEART DISEASE
See CARDIOVASCULAR DISEASES
HEAT DISSIPATION
See DIFFUSION
ENVIRONMENTAL TRANSPORT
HEAT DISTRIBUTION SYSTEMS
Leak Detectors
Leak location in district heating networks using acoustical correlation techniques, 8:33943 (R:FI:In Finnish)
HEAT EFFECTS
See TEMPERATURE EFFECTS
HEAT EXCHANGERS
Building Materials
Testing of heat exchanger systems for reheating flue gases from wet scrubbing desulfurization plants, 8:32943 (R:DE:In German)
Corrosion
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R:DE:In German)
Performance Testing
OTEC-1 heat exchanger test results, 8:33399 (RA:US)
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R:DE:In German)
Stress Analysis
Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger, 8:33708 (R:DE:In German)
Surface Cleaning
Testing of heat exchanger systems for reheating flue gases from wet scrubbing desulfurization plants, 8:32943 (R:DE:In German)
Thermal Stresses
Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger, 8:33708 (R:DE:In German)

HEAT PIPES
Corrosion
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R:DE:In German)
Performance Testing
Development and test of a space-reactor-core heat pipe, 8:33692 (R:US)
Performance limits for smooth-wall gravity-assisted heat pipes, 8:34231 (R:US)
Tests on a pilot plant for reheating desulphurized flue gases with the help of heat pipes, 8:33954 (R:DE:In German)
HEAT PUMPS
See also GROUND SOURCE HEAT PUMPS
WATER SOURCE HEAT PUMPS
Absorption Refrigeration Cycle
Absorption heat pump for heating small residential buildings, 8:33888 (R:DE:In German)
Coefficient of Performance
Refrigeration of milk - heating of dwelling-houses. Experimental evidence, 8:33936 (R:SE:In Swedish)
Design
Air/water heat pumps for three houses in Gothenburg (Sweden), 8:33295 (R:SE:In Swedish)
Heat Recovery
Heat-pump desuperheaters for supplying domestic hot water - estimation of energy savings and economic viability for residential applications, 8:33900 (R:US)
Waste Heat Utilization
Refrigeration of milk - heating of dwelling-houses. Experimental evidence, 8:33936 (R:SE:In Swedish)
HEAT RECOVERY
Economic Analysis
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 1, 8:33931 (R:DE:In German)
HEAT RESISTING ALLOYS
See also HASTELLOYS
INCOLOY ALLOYS
RENE 41
STAINLESS STEEL-304
STAINLESS STEEL-304L
STAINLESS STEEL-316
Corrosion
Consideration of a possible mechanism for the corrosion of high temperature components in atmospheric coal fired fluidized bed combustors, 8:33092 (BA:US)
Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA:US)
Erosion
Erosion/corrosion of superalloy test coupons exposed to PFB coal combuster effluent (IN-792, U-700, TAZ-8A), 8:33982 (BA:US)
HEAT STORAGE DEVICES
See THERMAL ENERGY STORAGE EQUIPMENT
HEAT STORAGE SYSTEMS
See THERMAL ENERGY STORAGE EQUIPMENT
HEAT TRANSFER PROPERTIES
See THERMODYNAMIC PROPERTIES
HEATER OIL
See HEATING OILS
HEATING LOAD
Calculation Methods
Annual load curves: a new design tool, 8:33458 (J:US)
F-load: a building heating load calculation program, 8:33452 (J:US)
HEATING OILS
Energy Demand
Michigan residential heating oil survey, winter 1982/83. Final report, 8:33853 (R:US)
Inventories
Survey on prices, volumes, and inventory data for residential and rack No. 2 heating oil, October 1, 1982-May 31, 1983, 8:33854 (R:US)
Prices
Survey on prices, volumes, and inventory data for residential and rack No. 2 heating oil, October 1, 1982-May 31, 1983, 8:33854 (R:US)
HEATING SYSTEMS
See also GEOTHERMAL HEATING SYSTEMS
SOLAR HEATING SYSTEMS
Regional Cooperation
STOSEB 80. Regional energy plan, 8:33828 (R:SE:In Swedish)
HEAVY ION ACCELERATORS
Includes combined accelerator types for heavy ion acceleration.
See also VICKSI
Beam Injection
Intense low energy heavy ion beams from a tandem dynamitron, Part II, 8:34345 (BA:US)
Computerized Control Systems
High-performance control system for a heavy-ion medical accelerator, 8:34318 (R:US)
Induction
Threshold behavior for longitudinal stability of induction linac bunches, 8:34283 (R:US)
Quadrupole Linacs
Mechanical design of a heavy-ion RFQ, 8:34271 (R:US)
Uses
Application of accelerators for solution of the national economy problems, 8:34266 (RA:SU:In Russian)
HEAVY ION REACTIONS
See also BERYLLIUM 9 REACTIONS
MAGNESIUM 24 REACTIONS
NITROGEN 15 REACTIONS
OXYGEN 16 REACTIONS
OXYGEN 18 REACTIONS
QUASI-FISSION
SILICON 28 REACTIONS
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
Quasi-Fission
Quasi-fission, 8:34835 (R:US)
Resonance
Resonances in heavy systems, 8:34806 (R:US)
HEAVY IONS
Whenever possible use one of the more specific terms listed under ION BEAMS.
Channeling
Resonant coherent excitation of fast heavy ions, 8:34715 (RA:US)
Collisions
Recoil ions: production and uses, 8:34713 (RA:US)
Diagnostic Uses
Heavy-ion radiography, 8:34550 (RA:US)
Ion Dosimetry
Radiotherapy physics, 8:34549 (RA:US)
Ion Sources
ECR heavy-ion source for the LBL 88-inch cyclotron, 8:34320 (R:US)
Ion Spectroscopy
Semiempirical studies of the spectra heavy and highly ionized atoms, 8:34718 (RA:US)
Ultraviolet spectroscopy with highly-stripped heavy ions, 8:34710 (RA:US)
Ion-Atom Collisions
Electron spectroscopy with fast heavy ions, 8:34711 (RA:US)
Laser Spectroscopy
Laser spectroscopy with fast heavy ion beams, 8:34717 (RA:US)
Physics
Radiotherapy physics, 8:34549 (RA:US)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
HEAVY NUCLEI
For nuclei from mass 181 upwards.
See also ACTINIDE NUCLEI
LEAD 207
LEAD 208
PLATINUM 194
RADIUM 226
Neutron Reactions
Thermal neutron capture gamma-rays, 8:34789 (R:US)
HEAVY OILS
See PETROLEUM

HEAVY WATER
Binding Energy
Studies of the formation and structure of homomolecular and heteromolecular clusters, 8:34127 (J:NL)
HEAVY WATER COOLANT
See HEAVY WATER
HEAVY WATER MODERATOR
See HEAVY WATER
HELIUM
Absorption Spectroscopy
Intracavity absorption line shape and the super-regen model, 8:34728 (J:NL)
Breakdown
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
Dielectric Properties
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Electron Attachment
Electron attachment in freon in the absence of ionization using mixtures of freon and inert gases, 8:34700 (RA:US)
Ion-Atom Collisions
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R:US)
Mixtures
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Photoionization
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)
Separation Processes
Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R:US)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
HELIUM 3 A
Specific Heat
Specific heat of ^{3}He in the Fermi-liquid region, 8:34739 (R:US)
Temperature Measurement
Specific heat of ^{3}He in the Fermi-liquid region, 8:34739 (R:US)
HELIUM 3 REACTIONS
Quasi-Free Reactions
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
HELIUM 4 REACTIONS
See ALPHA REACTIONS
HELIUM IONS
Photon-Ion Collisions
Photodetachment cross sections for He^- ($^4P^o$), 8:34729 (J:US)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
HELIUM-NEON LASERS
Biological Effects
Functional analysis of laser-induced ocular damage, 8:34665 (RA:US)
HEMATITE
Catalytic Effects
Mg- and Si-doped iron oxides for the photocatalyzed production of hydrogen from water by visible light (2.2 eV $\leqq$ h nu $\leqq$ 2.7 eV), 8:33260 (J:US)
HEPTANE
Chemical Reactions
Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1, 8:33270 (J:US)
HEXANE
Chemical Reactions
Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1, 8:33270 (J:US)
Radiolysis
ESR spectra and structure of the n-butane and n-hexane radical cations, 8:34198 (J:NL)
HEXOKINASE
Enzyme Activity
Comparison of the effects of glucose, glucose 6-phosphate and inorganic orthophosphate on the fluorescence and quenchability of hexokinase, 8:34489 (J:NL)
HFIR REACTOR
Reactor Materials
Response of aluminum and its alloys to exposure in the high flux isotope reactor, 8:33735 (R:US)
HGI2 SEMICONDUCTOR DETECTORS
Response Functions
Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers, 8:34381 (J:US)
HIGGS MODEL
Metrics
Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric, 8:34784 (R:JP)
HIGH BTU GAS
Over 900 Btu/ft^3.
Production
Optimization of fixed bed methanation processes, 8:33271 (J:US)
HIGH ENERGY PHYSICS
Use only for articles of a very broad nature such as an annual research program, etc.
Experiment Planning
Current experiments in elementary-particle physics, 8:34750 (R:US)
Meetings
Particles and fields - 1982, 8:34744 (B:US)
Proceedings of the international seminar on high energy physics and quantum field theory. Vol. 1, 8:34743 (R:SU)
Proceedings of the sixth symposium on theoretical physics. Elementary particle physics and relativity, 8:34781 (R:BR)
Research Programs
Current experiments in elementary-particle physics, 8:34750 (R:US)
HIGH ENERGY RADIOTHERAPY
See RADIOTHERAPY
HIGH EXPLOSIVES
See CHEMICAL EXPLOSIVES
HIGH FLUX ISOTOPE REACTOR
See HFIR REACTOR
HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES
HIGH TEMPERATURE GAS COOLED AND GRAPHITE
See HTGR TYPE REACTORS
HIGH VOLTAGE DIRECT CURRENT SYSTEMS
See HVDC SYSTEMS
HIGH-LEVEL RADIOACTIVE WASTES
Corrosive Effects
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Hydraulic Transport
Predicting transport requirements for radioactive-waste slurries, 8:33187 (R:US)
Leaching
Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass, 8:33238 (J:US)
Leaks
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radioactive Waste Storage
Numerical calculation of three-dimensional long-time temperature fields using a special finite element method: the final storage of highly radioactive waste in salt rocks, 8:34463 (R:DE:In German)
Waste-Rock Interactions
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
HIGHLY ENRICHED URANIUM
80 - 100 per cent.

Sampling
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:33256 (R:US)

HIGH-TEMPERATURE FUEL CELLS
See also MOLTEN CARBONATE FUEL CELLS
Operation
Zircohia fuel cells and electrolyzers, 8:33885 (BA:US)
Thermodynamics
Zirconia fuel cells and electrolyzers, 8:33885 (BA:US)

HIGHWAYS
See ROADS

HIPPURAN
Renal Clearance
Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen, 8:34524 (R:DE:In German)

HISTONES
Acetylation
Histone variants and histone modifications in chromatin fractions from heterochromatin-rich Peromyscus cells, 8:34490 (J:US)
Cytological Techniques
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)
Molecular Structure
Nucleosomes: composition and substructure, 8:34493 (BA:US)
Phosphorylation
Histone variants and histone modifications in chromatin fractions from heterochromatin-rich Peromyscus cells, 8:34490 (J:US)
Physical Properties
Isolation and characterization of chromatin subunits, 8:34501 (BA:US)

HOLMIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)

HOLMIUM 154
High Spin States
Transition from collective to noncollective rotation at high spin in N ≃ 87 nuclei, 8:34831 (R:US)

HORDEUM
See BARLEY

HORSES
Biomedical Radiography
Roentgenologic examinations on the larynx of the horse, 8:34515 (R:DE:In German)

HOT GAS CLEANUP
Adsorbents
Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982 (Iron orthosilicate, cobalt titanate, iron chromite, cobalt aluminate, manganous oxide), 8:32952 (R:US)
Research Programs
Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982 (Iron orthosilicate, cobalt titanate, iron chromite, cobalt aluminate, manganous oxide), 8:32952 (R:US)

HOT WATER
Sensible Heat Storage
Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures >=90°C, 8:33780 (R:DE:In German)
Model to calculate the temperature characteristics of heat storage basins, 8:33781 (R:DE:In German)

HOT-DRY-ROCK SYSTEMS
Program Management
Report of the Energy Research Advisory Board on hot dry rock, 8:33564 (R:US)
Rock Mechanics
Quantitative petrostructure analysis, 8:33571 (RA:US)

HOUSEHOLDS
Energy Demand
Demand of energy by households. Some studies of the determining factors of the demand and of the effects of the allotment by energy taxation, 8:33892 (R:SE:In Swedish)

HOUSES
Air Infiltration
Study of air infiltration in tight homes, 8:33910 (J:US)
Air Quality
Study of air infiltration in tight homes, 8:33910 (J:US)
Architecture
Jersey Devil architecture: there's more to it than a low utility bill, 8:33509 (J:US)
Attached Greenhouses
Humidity fluctuations in solar greenhouse-residences, 8:33477 (J:US)
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J:US)
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Utility impact and thermal performance of the Franta residence, 8:33506 (J:US)
Cooling Load
Residential heating and cooling loads and costs for the south, 8:33530 (J:US)
Design
Missouri house, 8:33520 (J:US)
Prototype biosphere: adobe habitat, 8:33916 (J:US)
Direct Gain Systems
Carpeted slab floors and comfort in direct gain systems, 8:33440 (J:US)
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J:US)
Optimum conservation in direct gain homes: a new freedom for designers, 8:33504 (J:US)
Passive solar retrofit: comparisons of computer simulated performance with monitored data, 8:33461 (J:US)
Passive Solar Masonry Workbook, 8:33488 (J:US)
Thermal performance of an earth-sheltered passive solar residence, 8:33423 (J:US)
Utility impact and thermal performance of the Franta residence, 8:33506 (J:US)
Double Envelope Buildings
Analysis of the Bergstedt residence. A double envelope house in Duluth, Minnesota, 8:33419 (J:US)
Earth Berms
Thermal performance of an earth-sheltered passive solar residence, 8:33423 (J:US)
Energy Conservation
Conservation and passive solar: a performance comparison in Washington State, 8:33444 (J:US)
Study of solar and energy conserving houses in California: preliminary results, 8:33447 (J:US)
Heating Load
Annual load curves: a new design tool, 8:33458 (J:US)
Residential heating and cooling loads and costs for the south, 8:33530 (J:US)
Load Management
Load management and the La Vereda passive solar community, 8:33417 (J:US)
Optimization
Optimum conservation for northeast homes, 8:33908 (J:US)
Passive Solar Cooling Systems
Non-instrumented performance evaluation of 335 passive solar homes, 8:33414 (J:US)
Passive Solar Heating Systems
Architectural/solar design methodology, 8:33511 (J:US)
Building and marketing passive solar homes, 8:33495 (J:US)
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)
Comparison of measured and predicted thermal performance of passive solar residences, 8:33466 (J:US)
Conservation and passive solar: a performance comparison in Washington State, 8:33444 (J:US)
Critical users' manual for passive solar homes, 8:33476 (J:US)

Denver Metro Solar House: incremental costs and payback analysis, 8:33297 (J:US)
Integrating passive solar systems with exciting architectural form, 8:33513 (J:US)
Load management and the La Vereda passive solar community, 8:33417 (J:US)
Marketable passive solar housing design for merchant builders, 8:33493 (J:US)
Missouri house, 8:33520 (J:US)
Natural convection heating system: off-the-wall evaluation methods, 8:33428 (J:US)
Non-instrumented performance evaluation of 335 passive solar homes, 8:33414 (J:US)
Not everyone's a scientist - not everyone's a bureaucrat (Financing and monitoring of passive solar houses in North Carolina), 8:33494 (J:US)
Novel analysis technique used in the Oregon passive monitoring project, 8:33421 (J:US)
Parametric study of a passive solar-heated house with special attention on evaluating occupant thermal comfort, 8:33479 (J:US)
Passive solar residential Class C monitoring program in the Northeast Region, 8:33416 (J:US)
Passive solar construction handbook, 8:33486 (J:US)
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Passive solar energy retrofit for energy efficient housing in hot humid climates, 8:33531 (J:US)
Photovoltaics and passive: the house of the future, 8:33363 (J:US)
Portfolio of passive solar homes designed, constructed and marketed by New York State Builders/Developers, 8:33490 (J:US)
Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J:US)
Solar homebuilders program: getting builders to build solar, 8:33317 (J:US)
Study of solar and energy conserving houses in California: preliminary results, 8:33447 (J:US)
Towards a bioclimatic architecture, 8:33507 (J:US)

Performance Testing
Short-term test for houses, 8:33437 (J:US)
Study of solar and energy conserving houses in California: preliminary results, 8:33447 (J:US)

Photovoltaic Power Supplies
Photovoltaics and passive: the house of the future, 8:33363 (J:US)

Solar Architecture
Monticello: an early American prototype for solar architecture, 8:33536 (J:US)

Solar Heating Systems
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J:US)
Thermal interaction in a hybrid house, 8:33420 (J:US)

Solar Space Heating
Evolution of the air thermosiphon: toward production housing, 8:33429 (J:US)
Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report, 8:33404 (R:US)
Thermosiphon floor heating system: design considerations and performance data, 8:33427 (J:US)

Solar Water Heating
Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report, 8:33404 (R:US)

Thermal Insulation
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)

Thermal Mass
Thermal mass in a hot-humid climate, 8:33532 (J:US)

Trombe Walls
Integrated passive solar and wood design for the Pacific Northwest, 8:33514 (J:US)

Wood Burning Furnaces
Integrated passive solar and wood design for the Pacific Northwest, 8:33514 (J:US)

HTGR TYPE REACTORS
See also AVR REACTOR
THTR-300 REACTOR

Coal Gasification
Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal, 8:33707 (R:DE:In German)

Computerized Simulation
Dynamic modeling of an HTGR pebble bed reactor, 8:33683 (RA:IL)

Heat Exchangers
Mechanical and thermal operation loads of the tubes of a nuclear heated reforming process heat exchanger, 8:33708 (R:DE:In German)

Reactor Safety
High-temperature gas-cooled-reactor safety studies for the Division of Accident Evaluation. Quarterly progress report, July 1-September 30, 1982. Volume 3, 8:33760 (R:US)
Nuclear reactor safety. Progress report, July 1-October 31, 1982 (Los Alamos National Laboratory), 8:33759 (R:US)
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)

Steam Generators
Construction of helium-heated steam reformers for high-temperature-reactors, 8:33686 (R:DE:In German)
Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis, 8:33682 (R:US)
Simplified moving boundaries HTGR steam generator model for the DSNP simulation language, 8:33684 (RA:IL)

Technology Assessment
Studies for the layout and technical conception of a two-circuit HTR power plant of 600 MWsub(el) under public utilizer aspects, 8:34469 (R:DE:In German)

HTO
See HEAVY WATER

HUGENHOLTZ-PINES THEORY
See HYDROGEN

HUMAN CELLS
See ANIMAL CELLS

HUMAN POPULATIONS

Delayed Radiation Effects
Calculation of health effects per curie release for comparison with the EPA standard, 8:33250 (RA:US)
Health effects associated with unit radonuclide releases to the environment, 8:33249 (RA:US)
Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6, 8:33248 (R:US)

Dose Equivalents
Radiological impact of Hanford operations, 8:34431 (RA:US)

Mental Disorders
Effects of the accident at Three Mile Island on the mental health and behavioral responses of the general population and nuclear workers, 8:33750 (R:US)

Radiation Doses
Penetrating radiation, 8:34430 (RA:US)

HUMANS
See HUMAN POPULATIONS

HUMUS

Photochemical Reactions
Dissolved humic materials: photodegradation, sediment effects, and reactivity with phosphate and calcium carbonate precipitation, 8:34446 (J:DE)
UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake, 8:34443 (J:US)

Water Chemistry
Dissolved humic materials: photodegradation, sediment effects, and reactivity with phosphate and calcium carbonate precipitation, 8:34446 (J:DE)

HVDC SYSTEMS
69 to 230 kV.

Electrical Insulators
Charge accumulation on spacer surface at dc stress in compressed SF_6 gas, 8:33637 (RA:US)
Development of surface charges on epoxy resin spacers stressed with direct applied voltages, 8:33636 (RA:US)

Gas-Insulated Substations
Charge accumulation on spacer surface at dc stress in compressed SF_6 gas, 8:33637 (RA:US)
HYBRID REACTORS
Design
Fusion-breeder-reactor design studies, 8:34949 (R:US)
HYDRATED ELECTRONS
See SOLVATED ELECTRONS
HYDRAULIC RAMS
See PUMPS
HYDRAZINE
Health Hazards
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Toxicity
Chemical carcinogen (hydrazine et al.) induced carcinogenesis of human diploid cells in vitro. Annual progress report 1 Sep 81-31 Aug 82, 8:34612 (R:US)
HYDROCARBONS
See also ALKANES
ALKENES
ANTHRACENE
AZULENE
BENZANTHRACENE
BENZENE
BENZOPYRENE
CHRYSENE
NAPHTHALENE
PHENANTHRENE
POLYCYCLIC AROMATIC HYDROCARBONS
POLYENES
PYRENE
STYRENE
TRIPHENYLENE
Biodegradation
Adherence of bacteria to hydrocarbons, 8:33106 (RA:US)
Catalytic Reforming
Further developments in the nickel/urania/α-alumina catalyst system, 8:33141 (J:GB)
Chemical Radiation Effects
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)
Chromatography
Chemical exploration by computer, 8:33103 (J:GB)
Diagenesis
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R:US)
Excitation
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)
Explosions
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R:NO)
Fires
Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires, 8:33145 (R:NO)
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R:NO)
Gas Chromatography
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R:US)
Ionization
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)
Mass Spectroscopy
Applied Fischer-Tropsch kinetics with flame-sprayed catalysts. Final report, 8:33265 (R:US)
Photochemistry
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)
Thermal Cracking
Thermal cracking of tars and hydrocarbons by adding oxygen and steam, 8:33331 (R:SE:In Swedish)
HYDROCEPHALUS
See MALFORMATIONS
HYDROCYANIC ACID
Dielectric Properties
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)
HYDRODYNAMIC MODEL
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
HYDROELECTRIC POWER
Comparative Evaluations
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
Cost
Cost evolution of electric energy in Brazil, 8:33626 (RA:BR:In Portuguese)
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
HYDROELECTRIC POWER PLANTS
Environmental Impacts
Environmental impacts program, 8:33066 (RA:US)
HYDROELECTRICITY
See HYDROELECTRIC POWER
HYDROFLUORIC ACID
Dielectric Properties
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)
HYDROGEN
Adsorption
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Chemical Reaction Kinetics
Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R:US)
Chemical Reactions
Water gas shift reaction. II, 8:33272 (J:IN)
Water gas shift reaction. I, 8:33273 (J:IN)
Chemisorption
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
Hydrogen chemisorpton on Pt single crystal surfaces in acidic solutions, 8:34133 (J:NL)
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
G Value
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)
Gas production from alpha radiolysis of concrete containing TRU incinerator ash. Progress report 2, August 1-November 30, 1978, 8:34043 (R:US)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
Ion-Atom Collisions
Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy, 8:34726 (R:JP)
Metallurgical Effects
Development of a load cell for mechanical testing in hydrogen, 8:33959 (R:US)
Oscillator Strengths
Rules for S(-2k) dipole sums, 8:34733 (J:DE)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Photoionization
Photoelectron angular distributions from H_2 and D_2, 8:34181 (J:NL)
Shock Waves
Effect of minute quantities of impurities on shock tube kinetics. The reaction $H_2 + D_2$ yields 2HD, 8:34088 (R:US)
Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R:US)
Thermal Conductivity
Thermal conductivity of mixtures of hydrogen with nitrogen, 8:34103 (J:DE)

Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Water Gas Processes
Water gas shift reaction. II, 8:33272 (J:IN)
HYDROGEN 2
See DEUTERIUM
HYDROGEN 3
See TRITIUM
HYDROGEN CYANIDES
See HYDROCYANIC ACID
HYDROGEN FLUORIDES
See HYDROFLUORIC ACID
HYDROGEN FUEL CELLS
Cost
Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA:US)
Hydrogen Generators
Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA:US)
Performance
Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA:US)
HYDROGEN GENERATORS
Characteristics of an NH_3-air fuel cell system for vehicular applications, 8:33886 (BA:US)
HYDROGEN HYDROXIDES
See WATER
HYDROGEN IONS
Lamb Shift
X-ray spectroscopy with fast heavy-ion beams, 8:34709 (RA:US)
HYDROGEN LOGS
See NEUTRON-GAMMA LOGGING
HYDROGEN NITRATES
See NITRIC ACID
HYDROGEN PEROXIDE
G Value
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)
HYDROGEN PHOSPHATES
See PHOSPHORIC ACID
HYDROGEN PRODUCTION
Biomimetic Processes
Control of photosensitized electron transfer reactions in organized interfacial systems: vesicles, water-in-oil microemulsions, and colloidal silicon dioxide particles, 8:33261 (J:US)
Electrolysis
Advanced water electrolysis technology for efficient utilization of ocean thermal energy, 8:33377 (RA:US)
Photochemical Reactions
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R:DE:In German)
Photoelectrolysis
Mg- and Si-doped iron oxides for the photocatalyzed production of hydrogen from water by visible light (2.2 eV $\leq$ h nu $\leq$ 2.7 eV), 8:33260 (J:US)
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R:DE:In German)
Thermochemical Processes
Thermal decomposition of trans-dibromotetraaquovanadium(III) bromide, $[VBr_2(H_2O)_4]Br.2H_2O$, 8:34108 (J:CH)
HYDROGEN SILICATES
See SILICIC ACID
HYDROGEN STORAGE
Containers
Project "usage of hydrogen for purposes of energy technology", 8:33263 (R:AT:In German)
Hydrides
Project "usage of hydrogen for purposes of energy technology", 8:33263 (R:AT:In German)
HYDROGEN SULFATES
See SULFURIC ACID
HYDROGENATION
Catalysts
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
HYDROLOGY
Tracer Techniques
Institute for Radiohydrometry - annual report 1980, 8:34441 (R:DE:In German)
HYDROXY COMPOUNDS
For organic compounds only and excluding SACCHARIDES, GLYCOSIDES and HYDROXY ACIDS.
See also OXIMES
PHENOLS
PYRIDOXINE
Absorption Spectroscopy
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Isomerization
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Luminescence
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Radiolysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Structural Chemical Analysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Ultraviolet Spectra
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
HYDROXYBENZENE
See PHENOL
HYDROXYL IONS
See ANIONS
HYDROXYL RADICALS
G Value
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)

I

IAEA SAFEGUARDS
Inspection
Problems of non-proliferation and nuclear safeguards, 8:34470 (R:DE:In German)
ICE
Mechanical Properties
Analytical and experimental studies on penetration into geological targets, 8:34225 (R:US)
ICR HEATING
Coupling
Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R:US)
Mathematical Models
Modeling of ICRF heating of a tokamak plasma, 8:34903 (R:US)
RF Systems
Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R:US)
IDAHO
See also RAFT RIVER VALLEY
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

IDAHO CHEMICAL PROCESSING PLANT
Radioactive Waste Management
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
IEA
See INTERNATIONAL ENERGY AGENCY
IGNEOUS ROCKS
Dynamic Loads
Determination of crack porosity from ratios of static and dynamic bulk moduli, 8:33573 (RA:US)
Static Loads
Determination of crack porosity from ratios of static and dynamic bulk moduli, 8:33573 (RA:US)
IGNITION (THERMONUCLEAR)
See THERMONUCLEAR IGNITION
IGT WASTE PROCESS
See BIOGAS PROCESS
ILLINOIS
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
Soil Conservation
Erosion potential of reclaimed agricultural lands in Perry County. Final report, 8:34434 (R:US)
Weatherization
Peoria weatherization program, 8:33786 (R:US)
IMAGE PROCESSING
Programming
New implementation for the binary and minkowski operators, 8:34975 (J:US)
IMIDES
Physical Properties
Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R:US)
Positrons
Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R:US)
IMINES
For aldehyde and ketone derivatives only.
Quantitative Chemical Analysis
Air sampling and liquid chromatographic determination of ethylenimine, 8:34409 (J:US)
IMMUNE REACTIONS
Radioimmunoassay
Clinical relevance of radioimmunologic gastrin determination for peptic ulcer, 8:34530 (R:DE:In German)
Investigations on a cortisol-iodine-125-radioimmunoassay test system, 8:34531 (R:DE:In German)
Radioimmunologic determination of testosterone and 5α-dihydrotestosterone in the plasma of women with hirsutism, 8:34525 (R:DE:In German)
IMMUNOSUPPRESSION
Radioinduction
Marrow transfusions into normal recipients, 8:34478 (RA:US)
IMPERMEABLE DRY ROCK
See HOT-DRY-ROCK SYSTEMS
INCINERATORS
Environmental Impacts
Environmental impacts of proposed toxic substances incinerator, 8:34254 (RA:US)
INCOLOY 800
Fatigue
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
Materials Testing
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
INCOLOY ALLOYS
See also INCOLOY 800
Corrosion
Selection and use of alloys for flue gas desulfurization systems, 8:33960 (RA:US)
INCONEL 600
Intergranular Corrosion
Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R:US)
Stress Corrosion
Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R:US)
Ranking of environments in stress-corrosion cracking, 8:33955 (R:US)
INCONEL 738
Erosion
Effect of PFBC particulate on the high velocity erosion-corrosion of gas turbine materials, 8:33007 (BA:US)
IN-CORE FUEL MANAGEMENT
See FUEL MANAGEMENT
INDIA
Energy Policy
India - energy situation 1981, 8:33835 (R:DE:In German)
Energy Supplies
India - energy situation 1981, 8:33835 (R:DE:In German)
INDIANA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
INDIANS (AMERICAN)
See AMERICAN INDIANS
INDOOR AIR POLLUTION
Toxicity
Guidelines for recirculation on exhaust air. Technical report, 8:34632 (R:US)
INDUCTION GENERATORS
Harmonics
Influence of the harmonics in rotor current on the wave shape of the stator voltage in a double-fed winddriven induction generator, 8:33609 (R:SE)
INDUSTRIAL PLANTS
See also COAL GASIFICATION PLANTS
COAL LIQUEFACTION PLANTS
METHANOL PLANTS
WASTE PROCESSING PLANTS
Economic Analysis
PRP-4: an updated version of the discounted-cash-flow program PRP, 8:34964 (R:US)
Fuel Substitution
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)
Risk Assessment
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)
System Failure Analysis
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)
INDUSTRIAL RELATIONS
See LABOR RELATIONS
INDUSTRIAL SECTOR
See INDUSTRY
INDUSTRY
See also AGRICULTURE
BEVERAGE INDUSTRY

ELECTRIC POWER INDUSTRY
GLASS INDUSTRY
METAL INDUSTRY
NATURAL GAS INDUSTRY
PETROLEUM INDUSTRY
WOOD PRODUCTS INDUSTRY

Energy Demand
Analyzing industrial energy demand: organization and analysis of information, 8:33826 (R:US)

Solar Process Heat
Advanced solar thermal technology, 8:33543 (J:US)

Waste Heat Utilization
Temperature booster of waste heat for room heating, 8:33937 (R:SE:In Swedish)

INERTIAL CONFINEMENT
A dynamic plasma confinement by inertial forces.

Reviews
Advanced lasers program: National Laboratory programs, 8:34941 (R:US)

INFANTS

Blood Plasma
Apolipoprotein E in umbilical cord blood plasma, 8:34552 (RA:US)

INFRARED SPECTROMETERS

Sample Holders
Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts, 8:34171 (J:US)

INNER-SHELL IONIZATION

Reviews
Collisions of fast heavy ions: an overview, 8:34708 (RA:US)

INSECTS

Migration
Evidence for upstream dispersion of adult caddisflies (trichoptera: hydrosychidae) in the Columbia River, 8:34444 (J:NL)

IN-SITU COMBUSTION

Field Tests
Controlled burnout at an abandoned coal mine fire, 8:33059 (RA:US)

Heat Recovery
Controlled burnout at an abandoned coal mine fire, 8:33059 (RA:US)

IN-SITU GASIFICATION
Cleanup of UCG product gas (Scrubbing vs. reductive incineration), 8:32973 (RA:US)
Project Thunderbird: a nuclear trigger for coal gasification, 8:33011 (J:US)

Bench-Scale Experiments
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)
Prospects for laboratory simulation of UCG system phenomena, 8:32993 (RA:US)

Borehole Linking
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA:US)
Fundamental research needs in underground coal gasification, 8:32987 (RA:US)
Horizontal drilling for underground coal gasification, 8:32968 (RA:US)
Major problems, first results and projects of underground gasification of deep coal in France, 8:32970 (RA:US)
Modeling studies of reverse combustion linking at high pressure, 8:32992 (RA:US)
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)
R and D program for UCG in bituminous coals, 8:32985 (RA:US)
Rawlins UCG test 2 reactor growth, 8:32965 (RA:US)
Results and postburn evaluation of TAMU's 1980 ULG field test in east Texas lignite, Rockdale site, 8:32969 (RA:US)
State of the Belgian-German experiment of underground gasification, 8:32975 (RA:US)

By-Products
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)

Cavities
Fundamental research needs in underground coal gasification, 8:32987 (RA:US)
Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA:US)
Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion (Hanna II and Hoe Creek), 8:32976 (RA:US)
Thermomechanical cavity growth modeling (Hanna 2 and Hoe Creek 3), 8:32977 (RA:US)

Chemical Reaction Kinetics
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)

Commercialization
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)
Shortest route to commercialization of UCG, 8:32989 (RA:US)
UCG-SDB, where do we go from here, 8:32988 (RA:US)

Control
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)

Control Systems
Instrumentation for optimizing an underground coal gasification process, 8:32998 (J:US)

Directional Drilling
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA:US)
Horizontal drilling for underground coal gasification, 8:32968 (RA:US)

Economic Analysis
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Economic comparison for UCG processes (Rawlins II; steeply dipping vs. horizontal beds), 8:32972 (RA:US)
Major problems, first results and projects of underground gasification of deep coal in France, 8:32970 (RA:US)
Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA:US)

Economics
Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)

Engineering Geology
Status of geotechnical studies at the Texas A and M University in situ gasification trials (Alcoa/Rockdale site in Milam County, Texas), 8:32966 (RA:US)

Environmental Effects
Effect of UCG on groundwater: a study of cavity and surrounding groundwater, 8:33069 (RA:US)
Groundwater quality in underground coal gasification: a regulatory outlook, 8:33068 (RA:US)
Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)

Environmental Impacts
Water-quality monitoring at the Hoe Creek test site: review and preliminary conclusions, 8:33070 (R:US)

Feasibility Studies
Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)
Colorado lignite for underground coal gasification, 8:32983 (RA:US)
R and D program for UCG in bituminous coals, 8:32985 (RA:US)
Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA:US)

Field Tests
Application of geological and mineralogical studies to underground coal gasification technology (Hanna 2 and Hoe Creek 3; pyrometamorphic changes), 8:32994 (RA:US)
Comparison of forward combustion gasification models, 8:32981 (RA:US)
Economic comparison for UCG processes (Rawlins II; steeply dipping vs. horizontal beds), 8:32972 (RA:US)
Fundamental research needs in underground coal gasification, 8:32987 (RA:US)
Industrial viewpoint of synthetic fuels, 8:32962 (RA:US)
Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA:US)

Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)
R and D program for UCG in bituminous coals, 8:32985 (RA:US)
Rawlins Test 2 data analysis, 8:32963 (RA:US)
Rawlins UCG test 2 reactor growth, 8:32965 (RA:US)
Results and postburn evaluation of TAMU's 1980 ULG field test in east Texas lignite, Rockdale site, 8:32969 (RA:US)
Shortest route to commercialization of UCG, 8:32989 (RA:US)
Status of geotechnical studies at the Texas A and M University in situ gasification trials (Alcoa/Rockdale site in Milam County, Texas), 8:32966 (RA:US)
Status of the Rawlins UCG-SDB program (Rawlins II), 8:32971 (RA:US)
Thermomechanical cavity growth modeling (Hanna 2 and Hoe Creek 3), 8:32977 (RA:US)
UCG-SDB, where do we go from here, 8:32988 (RA:US)
UCG test facility design criteria and evaluation, 8:32964 (RA:US)

Flames
Study of the flame extinction process for coal under UCG conditions, 8:32982 (RA:US)

Geophysical Surveys
Site characterization: geophysical R and D needs, 8:32986 (RA:US)

Ground Subsidence
Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion (Hanna II and Hoe Creek), 8:32976 (RA:US)

Heat Losses
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)
Rawlins Test 2 data analysis, 8:32963 (RA:US)
Study of the flame extinction process for coal under UCG conditions, 8:32982 (RA:US)

Leaks
Subsurface detection of retort gases from an underground coal gasification reactor in steeply dipping beds near Rawlins, Wyoming, 8:32979 (RA:US)

Magnetotelluric Surveys
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)

Mathematical Models
Comparison of forward combustion gasification models, 8:32981 (RA:US)
Fundamental research needs in underground coal gasification, 8:32987 (RA:US)
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)
Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA:US)
Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)
Study of the flame extinction process for coal under UCG conditions, 8:32982 (RA:US)

Measuring Instruments
Instrumentation for optimizing an underground coal gasification process, 8:32998 (J:US)
Rawlins UCG test 2 reactor growth, 8:32965 (RA:US)

Meetings
Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)

Monitoring
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)

Optimization
Instrumentation for optimizing an underground coal gasification process, 8:32998 (J:US)
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)

Overburden
Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA:US)

Permit Applications
Groundwater quality in underground coal gasification: a regulatory outlook, 8:33068 (RA:US)
Permitting requirements and procedures in selected states with UCG potential (Usually about 5 Federal and 8 to 15 state permits), 8:33101 (RA:US)

Planning
Major problems, first results and projects of underground gasification of deep coal in France, 8:32970 (RA:US)
UCG test facility design criteria and evaluation, 8:32964 (RA:US)

Pyrolysis
Mathematical modeling of the in situ coal gasification process (blockumstroemungsverfahren), 8:32978 (RA:US)

Radiant Heat Transfer
Study of the flame extinction process for coal under UCG conditions, 8:32982 (RA:US)

Recommendations
Shortest route to commercialization of UCG, 8:32989 (RA:US)
UCG-SDB, where do we go from here, 8:32988 (RA:US)

Regulations
Permitting requirements and procedures in selected states with UCG potential (Usually about 5 Federal and 8 to 15 state permits), 8:33101 (RA:US)

Research Programs
Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)
Large-block experiments in underground coal gasification, 8:32996 (R:US)
Proceedings of the eighth underground coal conversion symposium, 8:32961 (R:US)
R and D program for UCG in bituminous coals, 8:32985 (RA:US)

Simulation
Influence of pressure-swinging on the simulation of underground coal gasification (10 bar constant pressure vs pressure variation between 7.5 bar and 1.2 bar in a 20 minute cycle in a large autoclave), 8:32984 (RA:US)
Prospects for laboratory simulation of UCG system phenomena, 8:32993 (RA:US)

Site Selection
Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)
Major problems, first results and projects of underground gasification of deep coal in France, 8:32970 (RA:US)
Shortest route to commercialization of UCG, 8:32989 (RA:US)
Site characterization: geophysical R and D needs, 8:32986 (RA:US)

Thermal Efficiency
Rawlins Test 2 data analysis, 8:32963 (RA:US)

Tracer Techniques
Fundamental research needs in underground coal gasification, 8:32987 (RA:US)
Rawlins UCG test 2 reactor growth, 8:32965 (RA:US)

Well Spacing
Directional drilling as a means of creating gasification flow paths in underground coal gasification, 8:32967 (RA:US)

INSOLATION

Data Acquisition
Controlling the accuracy of solar radiation data from a low cost, 30 station network, 8:33468 (J:US)

Graphs
Graphs of average monthly insolation at arbitrary tilt and orientation, 8:33280 (J:US)

Mathematical Models
Merged solar and meteorological data base for solar energy use, 8:33282 (J:US)

INSPECTOR GENERAL (US DOE)
See US DOE INSPECTOR GENERAL

INSTRUMENTS (MEASURING)
See MEASURING INSTRUMENTS

INSULATING LIMITERS
See LIMITERS

INSULATION (ELECTRICAL)
See ELECTRICAL INSULATION

INSULATION (THERMAL)
See THERMAL INSULATION
INSULATORS (ELECTRICAL)
See ELECTRICAL INSULATORS
INTEGRATED CIRCUITS
Electric Contacts
Aluminum electromigration lifetime variations with linewidth: the effects of changing stress conditions, 8:34248 (R:US)
Ion Implantation
Application and further development of ion implantation for very large scale integration. Pt. 2, 8:34243 (R:DE:In German)
Application and further development of ion implantation for very large scale integration. Pt. 1, 8:34242 (R:DE:In German)
MOSFET
Development of a silicon gate CMOS technology with small structures, 8:34245 (R:DE:In German)
Development and application of process and device-simulation for 2μm MOS technology, 8:34244 (R:DE:In German)
INTERACTING BOSON MODEL
Relationship between the Bohr collective model and the interacting boson model, 8:34848 (BA:US)
INTERACTIVE DISPLAY DEVICES
Electronics engineer's design station, 8:34252 (J:US)
INTERACTIVE GRAPHICS
See INTERACTIVE DISPLAY DEVICES
INTERCONNECTED POWER SYSTEMS
Simulation
Interconnection problems associated with small dispersed electric generators and inverter devices, 8:33651 (R:US)
Wind Power Plants
Frequency and duration method for the evaluation of wind integration, 8:33598 (RA:DE)
Statistical methods for the assessment of wind power integration into the electricity supply system, 8:33597 (RA:DE)
Technical problems of WECS interconnection, 8:33600 (RA:DE)
INTERFEROMETERS
Visualization by holographic interferometry of temperatures in passive components, 8:33442 (J:US)
INTERMEDIATE MASS NUCLEI
For nuclei with mass 41-180.
See also COBALT 60
IODINE 125
IODINE 129
IODINE 131
IRON 60
KRYPTON 85
NICKEL 60
NIOBIUM 95
PALLADIUM 109
RARE EARTH NUCLEI
RUTHENIUM 106
STRONTIUM 89
STRONTIUM 90
TECHNETIUM 99
XENON 119
XENON 121
ZIRCONIUM 93
Neutron Reactions
Thermal neutron capture gamma-rays, 8:34789 (R:US)
INTERMEDIATE VECTOR BOSONS
Postulated Particles
Second Z in SO(10), 8:34766 (R:US)
INTERMEDIATE-LEVEL RADIOACTIVE WASTES
Underground Disposal
New hydrofracture facility at ORNL, 8:33194 (RA:US)
INTERNATIONAL ENERGY AGENCY
Research Programs
The IEA atmospheric fluidized bed combustion programme. An international co-operation. Paper to be presented at a meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Politique Scientifique at Brussels, 25 March 1983, 8:33087 (R:NL)
INTERNATIONAL TOKAMAK REACTOR
See INTOR TOKAMAK
INTERSECTING BEAMS
See COLLIDING BEAMS
INTERSECTING STORAGE ACCELERATOR
See ISABELLE STORAGE RINGS
INTOR TOKAMAK
International Tokamak Reactor.
First Wall
INTOR impurity control and first wall system, 8:34910 (R:US)
Impurities
INTOR impurity control and first wall system, 8:34910 (R:US)
Limiters
Electromagnetic effects on the FED/INTOR limiter, 8:34920 (R:US)
INVERSE SCATTERING PROBLEM
Topics in quarkonium physics, 8:34758 (R:US)
IODINATED ALIPHATIC HYDROCARBONS
See also METHYL IODIDE
Liquid Column Chromatography
Comments on column characterization: a sulfur column, 8:34069 (J:DE)
IODINE 125
Isotope Applications
Clinical relevance of radioimmunologic gastrin determination for peptic ulcer, 8:34530 (R:DE:In German)
IODINE 127 TARGET
Neutron Reactions
$^{127}I(n,2n)^{126}I$ reaction as a fast neutron flux monitor, 8:34380 (J:US)
IODINE 129
Adsorption
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R:AT:In German)
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
IODINE 131
Adsorption
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R:AT:In German)
Isotope Applications
Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen, 8:34524 (R:DE:In German)
Positron Computed Tomography
New blood flow radiopharmaceutical, 8:34545 (RA:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Foodstuffs, 8:34427 (RA:US)
IODODEOXYURIDINE
Biological Effects
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)
IODOHIPPURATE-NA
See HIPPURAN
ION ACOUSTIC WAVES
Non-dispersive ion waves
Solitons
Interaction of ion-acoustic solitons in multi-dimensional space, 2, 8:34737 (R:JP)
ION BEAM TARGETS
Stopping Power
Current status of calculations and measurements of ion stopping power in ICF plasmas, 8:34939 (R:US)
ION BEAMS
See also ARGON 40 BEAMS
CARBON 12 BEAMS
NEON 20 BEAMS
SILICON 28 BEAMS
Beam Transport
Quadrupole beam-transport experiment for heavy ions under extreme space charge conditions, 8:34284 (R:US)

Bragg Curve
Diagnostic studies with high energy radioactive beams, 8:34551 (RA:US)
Cross Sections
Correlated neutron-proton emission in relativistic heavy-ion interactions, 8:34751 (RA:US)
Physical characterization of energetic heavy-ion beams, 8:34313 (RA:US)
Depth Dose Distributions
Transport studies of the interaction of high-energy heavy ions with extended matter, 8:34752 (RA:US)
Diagnostic Uses
Diagnostic studies with high energy radioactive beams, 8:34551 (RA:US)
Stereotactic heavy-ion irradiation of intracranial vascular disorders, 8:34547 (RA:US)
Differential Cross Sections
Inclusive neutron production by energetic heavy ions, 8:34194 (RA:US)
Energy Losses
Physical characterization of energetic heavy-ion beams, 8:34313 (RA:US)
Molecular Biology
Cellular and molecular radiobiology of heavy-ion beams, 8:34594 (RA:US)
Radiobiology
Cellular and molecular radiobiology of heavy-ion beams, 8:34594 (RA:US)
Secondary Reactions
Inclusive neutron production by energetic heavy ions, 8:34194 (RA:US)
Uses
Heavy ion beam pumped He-Ar, He-Xe, and Ar-Xe gas lasers, 8:34228 (RA:US)

ION COLLISIONS
See also ION-ATOM COLLISIONS
ION-MOLECULE COLLISIONS
PHOTON-ION COLLISIONS
Recoils
Recoil ions: production and uses, 8:34713 (RA:US)

ION CYCLOTRON-RESONANCE HEATING
See ICR HEATING

ION PROPULSION
Mass Spectra
Spectroscopic investigations of a field emission generated radiative zone: Mass spectroscopic measurements. Final Report, 8:33926 (R:US)

ION SOURCES
Performance
First operation of the XTU-tandem 150 kv injector, 8:34333 (BA:US)
Improved miniature sputter source MISS-4, 8:34348 (BA:US)
Sputtering
Another version of a negative ion sputter source, 8:34347 (BA:US)
Improved miniature sputter source MISS-4, 8:34348 (BA:US)

ION-ATOM COLLISIONS
Electron Spectroscopy
Electron spectroscopy with fast heavy ions, 8:34711 (RA:US)
Inner-Shell Ionization
Collisions of fast heavy ions: an overview, 8:34708 (RA:US)
Meetings
Proceedings of the workshop on atomic physics with fast heavy-ion beams, 8:34707 (R:US)

IONIC CONDUCTIVITY
NMR studies of fast-ion conductors, 8:34863 (R:US)

IONIC REACTIONS
See CHEMICAL REACTIONS
IONS

IONIZATION
See also INNER-SHELL IONIZATION
PHOTOIONIZATION
Reviews
Ionization and excitation in non-polar organic liquids, 8:34185 (J:US)

IONIZATION CALORIMETERS
See SHOWER COUNTERS

IONIZATION CHAMBERS
Performance
Experience with work with double ionization chambers, 8:34371 (RA:CS:In Czech)
New fission fragment detectors for cross section and angular distribution measurements at CBNM, 8:34382 (J:US)

ION-MOLECULE COLLISIONS
Electron Attachment
Negative ion formation and neutralization processes, (1). Related to plasma heating by 'negative ion based neutral beam injection', 8:34899 (R:JP:In Japanese)

IONOPHORESIS
See ELECTROPHORESIS

IONS
Ions in solutions are indexed as compounds; ions in gases by the precoordinated descriptor consisting of the element name and the term ions; ions in beams by assigning either the specific name if available, e.g. ARGON 40 BEAMS
See also ALUMINIUM IONS
ANIONS
BERYLLIUM IONS
BORON IONS
CARBANIONS
CARBON IONS
CATIONS
CESIUM IONS
CHLORINE IONS
FLUORINE IONS
HEAVY IONS
HELIUM IONS
HYDROGEN IONS
KRYPTON IONS
LEAD IONS
LITHIUM IONS
MULTICHARGED IONS
POTASSIUM IONS
SILICON IONS
SULFUR IONS
TUNGSTEN IONS
URANIUM IONS
XENON IONS
Quadrupole Moments
Quadrupole polarizability of atoms and ions, 8:34725 (RA:SU:In Russian)

IOWA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

IRELAND
Energy Models
MEDEE 3: first results for Ireland and data collection. Final report, 8:33791 (R:XE)

IRIDIUM COMPLEXES
Crystal Structure
Synthesis and x-ray crystal structure of $[PPN]^+_2[Ru_4(CO)_9(\mu_4\text{-}CO)_3]^{2-}$, 8:34135 (J:NL)
Synthesis
Synthesis and x-ray crystal structure of $[PPN]^+_2[Ru_4(CO)_9(\mu_4\text{-}CO)_3]^{2-}$, 8:34135 (J:NL)

IRON
Catalytic Effects
Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J:US)
Neutron Transport
Measurements and analyses of neutron transport through iron, 8:34859 (J:US)
Oxidation
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Surface Properties
Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J:US)
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)

Transmission Electron Microscopy
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)

IRON 54 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106,114}Cd$, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)

IRON 56 TARGET
Neutron Reactions
Cross section for the $^{56}Fe(n,p)$ reaction for 14.73 MeV neutrons, 8:34818 (J:US)
Determination of the capture width of the 27.7 keV s-wave resonance in ^{56}Fe, 8:34814 (J:US)
Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV, 8:34811 (R:DE)
Neutron capture cross section measurements of ^{56}Fe, 8:34815 (J:US)
Neutron scattering cross sections from (n,n') and (n,n'γ) methods: a comparison, 8:34812 (J:US)

IRON 58 TARGET
Neutron Reactions
Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV, 8:34811 (R:DE)

IRON 60
Beta-Minus Decay
Measurement of the half-life of ^{60}Fe using the Argonne FN tandem-superconducting Linac system as an accelerator mass spectrometer, 8:34819 (R:US)

IRON ALLOYS
See also FERRITE
HASTELLOYS
INCONEL 600
IRON BASE ALLOYS
NIMONIC PE16
RENE 41
Microstructure
Hydrogen reduction of cobalt ferrite, 8:33992 (J:US)
Oxidation
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Reduction
Hydrogen reduction of cobalt ferrite, 8:33992 (J:US)
Sulfidation
High temperature sulfidation properties of iron-chromium-base alloys, 8:33981 (BA:US)
Surface Properties
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)
Transmission Electron Microscopy
Some analytical use of STEM for study of oxidation on metals, 8:33996 (BA:US)

IRON BASE ALLOYS
See also INCOLOY ALLOYS
STEELS
Corrosion
Morphology of corrosion of advanced heat exchanger materials in simulated FBC deposits, 8:33091 (BA:US)
Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA:US)

IRON BORIDES
Chemical Preparation
Characterization of an iron boride coating produced by pack boronization of low carbon steel, 8:34007 (J:GB)

IRON COMPLEXES
See also FERROCENE
Excited States
Temperature dependence of the lifetimes of the ligand-field states of tris(1,10-phenanthroline)iron(II), 8:34183 (J:NL)
Redox Potential
Bridged ferrocenes. VII. Correlation of redox potentials with structure, 8:34130 (J:NL)

IRON COMPOUNDS
See also IRON BORIDES
IRON NITRIDES
IRON OXIDES
IRON SULFIDES
Photochemical Reactions
UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake, 8:34443 (J:US)

IRON NITRIDES
Catalytic Effects
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
Chemical Preparation
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)
Structural Chemical Analysis
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)

IRON ORES
See also HEMATITE
Reduction
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R:SE:In Swedish)

IRON OXIDES
See also HEMATITE
Catalytic Effects
Effect of additives to iron oxide in the selective oxidative dehydrogenation reactions, 8:33140 (J:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
Water gas shift reaction. I, 8:33273 (J:IN)
Corrosion Resistance
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)
Nitridation
CO + H_2 reactions over nitrogen-modified iron catalysts. Quarterly technical progress report, January 1, 1983-March 31, 1983, 8:33267 (R:US)

IRON SULFIDES
Catalytic Effects
Disposable catalyst for coal liquefaction, 8:33008 (J:US)

IRRADIATION DEVICES
Design
New instrumentation for high-resolution, dynamic, three-dimensional tomography of positron-labeled compounds in the human body, 8:34378 (RA:US)

IRRADIATION RIGS
See IRRADIATION DEVICES

ISABELLE
See ISABELLE STORAGE RINGS

ISABELLE STORAGE RINGS
Performance
Recent developments at BNL, 8:34302 (R:US)
Radiation Detectors
Semiconductor devices as track detectors in high energy colliding beam experiments, 8:34323 (J:US)

ISOCHRONOUS CYCLOTRONS
Modifications
Present status of the isochronous cyclotron of Czechoslovak Academy of Sciences, 8:34268 (RA:SU:In Russian)
Performance
Present status of the isochronous cyclotron of Czechoslovak Academy of Sciences, 8:34268 (RA:SU:In Russian)

ISOELECTRONIC ATOMS
Lamb Shift
X-ray spectroscopy with fast heavy-ion beams, 8:34709 (RA:US)

ISOTOPE APPLICATIONS
NELMA project. I. Objectives of the methodical aspects (Nuclear Energy Laboratory of Medical and Agricultural Sciences), 8:34280 (J:US)

ISOTOPE ENRICHMENT
See ISOTOPE SEPARATION

ISOTOPE PRODUCTION
Surveys
Accelerators for radionuclide production, 8:33258 (J:US)
ISOTOPE SEPARATION
For separation of isotopes of the same element only.
See also LASER ISOTOPE SEPARATION
Computer Calculations
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)
ISOTOPIC SEPARATION
See ISOTOPE SEPARATION
ISRAEL
Nuclear Energy
Alternate pathways for the nuclear energy economy in Israel, 8:33815 (RA:IL)
Nuclear Fuels
Production of nuclear fuel in Israel. Feasibility and justification, 8:33816 (RA:IL)
Radioactive Waste Disposal
Radioactive waste disposal options for the operation of nuclear power stations, 8:33216 (RA:IL)
ISX TOKAMAK
ECR Heating
Electron heating and superthermal electron enhancement due to electron cyclotron heating in ISX-B at 28 GHz, 8:34900 (R:US)
Plasma Macroinstabilities
MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation, 8:34902 (R:US)
ITERATIVE METHODS
LU decomposition of M-matrices by elimination without pivoting, 8:34977 (J:US)
IUDR
See IODODEOXYURIDINE

J

J-3105 RESONANCES
See PSI-3105 RESONANCES
JAERI
Japanese Atomic Energy Research Institute.
Tandem Electrostatic Accelerators
JAERI tandem accelerator facility, 8:34327 (BA:US)
JAILS
See PUBLIC BUILDINGS
JAPANESE ATOMIC ENERGY RESEARCH INSTITUTE
See JAERI
JEZEBEL REACTOR
Reactivity
Fission source matrices in standard transport calculations, 8:33732 (RA:IL)
JOINTS (ANATOMY)
See BONE JOINTS

K

K REACTOR
Electrical Equipment
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactor Fueling
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Instrumentation
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Maintenance
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
K SHELL
Inner-Shell Ionization
Development of a low-pressure proportional chamber for particle detection in ion-X-ray-coincidence experiments and a study of inner shell differential ionisation probabilities, 8:34519 (R:DE:In German)
K-25 PLANT
See ORGDP
KANSAS
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
KARLSRUHE NUCLEAR RESEARCH CENTER
See KERNFORSCHUNGSZENTRUM KARLSRUHE
KENTUCKY
Black Shales
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Natural Gas Deposits
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Disposal
Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982 (Maxey Flats site), 8:33199 (R:US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982 (Maxey Flats site), 8:33198 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
KENYA
Energy Sources
Workplan for an analysis of the fuelwood cycle in Kenya and the feasiility of expanded fuelwood production, 8:33350 (R:SE)
KERNFORSCHUNGSZENTRUM KARLSRUHE
Data Processing
Results of research and development works 1981 of the Institute of Data Processing in the Field of Engineering, 8:34958 (R:DE:In German)
Nuclear Engineering
Results of research- and development works 1981 of the Main Department of Engineering, 8:33818 (R:DE:In German)
Research Programs
Results of research and development work 1981 of the Institute of Nuclear Engineering, 8:34954 (R:DE:In German)
KERNKRAFTWERK BIBLIS-3
See BIBLIS-3 REACTOR
KERNKRAFTWERK LINGEN
See LINGEN REACTOR
KERNKRAFTWERK OBRIGHEIM
See OBRIGHEIM REACTOR
KERNKRAFTWERK RWE-BAYERNWERK
See RWE-BAYERNWERK REACTOR
KERNKRAFTWERK WUERGASSEN
See WUERGASSEN REACTOR

KERR METRIC
Axial Symmetry
Some properties of the symmetry axis in a superpostion of two Kerr solutions, 8:34883 (R:JP)
KETO ACIDS
For CARBOXYLIC ACIDS only.
See also KYNURENINE
Agglomeration
Differential changes in ornithine aminotransferase self-affinity produced by exposure to basic amino acids and increases in the intrinsic electronegativity of the enzyme monomer, 8:34147 (J:US)
KETONES
See also ACETYLACETONE
Photolysis
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)
KIDNEYS
Computerized Tomography
Sonography and computerized tomography in a comparison in renal mass diseases, 8:34528 (R:DE:In German)
Dynamic Function Studies
Comparison of two nuclear-medical techniques for effective renal plasma flow determination in rabbits: Radiation controlled infusion-pump and whole-body measurement according to Oberhausen, 8:34524 (R:DE:In German)
Ultrasonography
Sonography and computerized tomography in a comparison in renal mass diseases, 8:34528 (R:DE:In German)
KINASES (PHOSPHOTRANSFERASES)
See PHOSPHOTRANSFERASES
KINK INSTABILITY
Analytical Solution
Reduced equations for internal kinks in tokamaks, 8:34907 (R:US)
KNOCK-ON ELECTRONS
See ELECTRONS
KOREA (SOUTH)
See REPUBLIC OF KOREA
KRB REACTOR
See RWE-BAYERNWERK REACTOR
KRYPTON
Adsorption
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
Electron-Atom Collisions
Spin polarization effects in low-energy elastic electron scattering, 8:34723 (R:NL)
Melting
Experimental studies of two dimensional melting, 8:34153 (BA:US)
KRYPTON 85
Environmental Transport
Validation of annual average air concentration predictions from the AIRDOS-EPA computer code, 8:34411 (RA:US)
Radioecological Concentration
Validation of annual average air concentration predictions from the AIRDOS-EPA computer code, 8:34411 (RA:US)
KRYPTON IONS
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
KRYPTON ISOTOPES
See also KRYPTON 85
Neutron Reactions
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
KWL REACTOR
See LINGEN REACTOR
KWO REACTOR
See OBRIGHEIM REACTOR
KWS-1 WYHL REACTOR
See WYHL-1 REACTOR
KYNURENINE
Metabolism
Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra, 8:34511 (R:US)

L

LABELLED COMPOUNDS
Compounds labelled with either stable or radioactive isotopes.
See also RADIOPHARMACEUTICALS
Chemical Preparation
New sequestering agents for the actinides, 8:34206 (RA:US)
LABOR RELATIONS
Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R:US)
LABORATORY BUILDINGS
Walls
Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures, 8:33179 (R:US)
LAGRANGE FIELD EQUATIONS
See LAGRANGIAN FIELD THEORY
LAGRANGIAN FIELD THEORY
Lie Groups
New approach to unified field theories, 8:34769 (R:XA)
Reviews
Topological aspects in field theory and confinement, 8:34780 (RA:BR)
Topology
Topological aspects in field theory and confinement, 8:34780 (RA:BR)
LAKES
Alkaline Phosphatase
Phytoplankton contribution to alkaline phosphatase activity, 8:34442 (J:DE)
Limnology
Isolation of cyclic adenosine 3':5'-monophosphate (cAMP) from lakes of differing trophic status: Correlation with planktonic metabolic variables, 8:34445 (J:US)
Water Chemistry
Asymmetrical relationships between absorbance, fluorescence, and dissolved organic carbon, 8:34448 (J:US)
Longterm dissolved and particulate alkaline phosphatase activity in a hardwater lake in relation to lake stability and phosphorus enrichments, 8:34447 (J:DE)
Phytoplankton contribution to alkaline phosphatase activity, 8:34442 (J:DE)
LAMINAR FLOW
Numerical Solution
Numerical computation of buoyancy-induced recirculation in curved square duct laminar flow, 8:34238 (J:GB)
Stability
Laminar-turbulent transition for flow in pipes, concentric annuli, and parallel plates, 8:34240 (J:US)
LAMINOGRAPHY
See TOMOGRAPHY
LAMPS
See LIGHT BULBS
LAND APPLICATION
See GROUND DISPOSAL
LAND FILLS
See SANITARY LANDFILLS
LAND RECLAMATION
Technology Assessment
Erosion potential of reclaimed agricultural lands in Perry County. Final report, 8:34434 (R:US)
LAND USE
Government Policies
Impacts of technology on US cropland and rangeland productivity, 8:34475 (R:US)
LANDFILLS
See SANITARY LANDFILLS
LANGMUIR OSCILLATIONS
See PLASMA WAVES
LANGUAGES (PROGRAMMING)
See PROGRAMMING LANGUAGES

LANTHANUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
LANTHANUM 138
Beta-Plus Decay
Half-life of ^{138}La, 8:34822 (R:US)
Electron Capture Decay
Half-life of ^{138}La, 8:34822 (R:US)
LANTHANUM CHROMITES
See CHROMIUM OXIDES
LANTHANUM HYDRIDES
Specific Heat
Heat capacities of LaDsub(x) (2.5 <= x <= 3) from 1 to 300 K, 8:34001 (J:CH)
LARGE COIL PROGRAM
Data Acquisition Systems
Programmer's guide to FFE: a fast front-end data-acquisition program, 8:34933 (R:US)
LARYNX
Biomedical Radiography
Roentgenologic examinations on the larynx of the horse, 8:34515 (R:DE:In German)
LASER FUSION REACTORS
Research Programs
1981 laser program annual report, 8:34943 (R:US)
Reviews
Advanced lasers program: National Laboratory programs, 8:34941 (R:US)
LASER ISOTOPE SEPARATION
Laboratory Buildings
Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures, 8:33179 (R:US)
LASER RADIATION
Transmission
Saturation of hot CO_2 by short 10.6 μm laser pulses, 8:34856 (J:US)
LASER SPECTROSCOPY
Uses
Laser spectroscopy with fast heavy ion beams, 8:34717 (RA:US)
LASER TARGETS
Inertial Confinement
Simple mechanism for the release of laser targets, 8:34932 (R:DE)
Laser Implosions
Simple mechanism for the release of laser targets, 8:34932 (R:DE)
Research Programs
1981 laser program annual report, 8:34943 (R:US)
LASERS
Light Amplification by Stimulated Emission of Radiation.
See also CHEMICAL LASERS
GAS LASERS
SEMICONDUCTOR LASERS
Research Programs
Advanced Lasers Program. Program/contracting plan, 8:34940 (R:US)
Reviews
Advanced lasers program: National Laboratory programs, 8:34941 (R:US)
Advanced Lasers Program: advanced laser concepts. Technical summary, 8:34942 (R:US)
LASL
Computer Networks
Distributed processors and intelligent workstations at Los Alamos, 8:34961 (R:US)
High-performance computing at Los Alamos, 8:34960 (R:US)
Distributed Data Processing
Distributed processors and intelligent workstations at Los Alamos, 8:34961 (R:US)
LATENT HEAT STORAGE
Standards
Comparison of testing methods for latent-heat-storage devices, 8:33548 (R:US)
Thermal Energy Storage Equipment
Comparison of testing methods for latent-heat-storage devices, 8:33548 (R:US)
LATTICES (REACTOR)
See REACTOR LATTICES
LAWRENCE LIVERMORE LABORATORY
Computer Networks
Modeling and monitoring a LAN (Local Area Network), 8:34969 (R:US)
Management
Report of the Energy Research Advisory Board on the relationship between the University of California and the Los Alamos Scientific and the Lawrence Livermore Laboratories, 8:34953 (R:US)
LEACHATES
Toxicity
Earth sciences, 8:34677 (RA:US)
LEAD
Biological Effects
Investigations of subclinical neurogenous damage of persons with chronic occupational exposure to lead and trichlorethylene, 8:34627 (R:DE:In German)
Neurological aspects of lead intoxication, 8:34626 (R:DE:In German)
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
Subtoxic lead exposure of the albino rat during different phases of development and its effects on the open-field behaviour and the learning ability as studied by discrimination tests, 8:34624 (R:DE:In German)
Brownian Movement
Lead aerosol Brownian collision rates at normal and elevated temperature: theory, 8:34098 (J:US)
Electrodeposition
Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R:US)
Nerves
Investigations of subclinical neurogenous damage of persons with chronic occupational exposure to lead and trichlorethylene, 8:34627 (R:DE:In German)
Poisoning
Effects of inorganic lead on behavioral and neurologic function. Final report, 8:34635 (R:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Toxicity
Neurological aspects of lead intoxication, 8:34626 (R:DE:In German)
Subtoxic lead exposure of the albino rat during different phases of development and its effects on the open-field behaviour and the learning ability as studied by discrimination tests, 8:34624 (R:DE:In German)
LEAD 206 TARGET
Proton Reactions
Elastic and inelastic scattering of polarized protons from ^{206}Pb near isobaric analog resonances, 8:34834 (R:US)
LEAD 207
Isobaric Analogs
Elastic and inelastic scattering of polarized protons from ^{206}Pb near isobaric analog resonances, 8:34834 (R:US)
LEAD 208
Energy-Level Transitions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
LEAD 208 TARGET
Photonuclear Reactions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)

LEAD ALLOYS
Fatigue
Testing of OTEC riser cable components and models, 8:33368 (RA:US)
LEAD IONS
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
LEAD-ACID BATTERIES
Design
Development of a stationary battery for high load with increased efficiency of load levelling, 8:33782 (R:DE:In German)
Optimization
Development of a stationary battery for high load with increased efficiency of load levelling, 8:33782 (R:DE:In German)
LEAKAGE
See LEAKS
LEAKAGE (NEUTRON)
See NEUTRON LEAKAGE
LEAKS
Acoustic Measurements
Leak location in district heating networks using acoustical correlation techniques, 8:33943 (R:FI:In Finnish)
LEAVES
Ultraviolet Radiation
Geometrical considerations: a brief synopsis, 8:34654 (RA:DE)
LEGISLATION
Reviews
Environmental laws and regulations: potential changes, 8:34419 (RA:US)
LEGISLATIVE PROGRAMS
See LEGISLATION
LENSES
See also ELECTROSTATIC LENSES
Computer-Aided Design
Accelerating convergence in automatic lens design, 8:34885 (J:US)
LEPTON NUMBER
Symmetry Breaking
B-L violating supersymmetric couplings, 8:34765 (R:US)
LEPTON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET
LEPTONS
See also ELECTRONS
Pair Production
Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R:US)
LET
Energy Dependence
Physical characterization of energetic heavy-ion beams, 8:34313 (RA:US)
LEUKEMIA
Radioinduction
Endogenous retrovirus and radiation-induced leukemia in the RMF mouse, 8:34572 (R:US)
LEUKEMOGENESIS
Radioinduction
Radiation-induced leukemogenesis in RFM/UN strain mice: a potential model for retrovirus sequence transposition (X-rays), 8:34606 (BA:US)
LEVEL INDICATORS
Feasibility study of acoustic sensors for slurry-level measurements in coal-liquefaction systems, 8:32942 (R:US)
LI-DRIFTED GE DETECTORS
Efficiency
Improvement of the detection efficiency of Li-drifted Ge-detectors for \-radiation by irradiance with infrared-light of the wavelength 1.520µm to 1.795µm, 8:34520 (R:DE:In German)
Sensitivity
Use of Ge(Li) spectrometry in monitoring personnel and environment. I, 8:34368 (RA:CS:In Czech)
LIE GROUPS
Irreducible Representations
Irreducible representations of the simple Lie groups II - the tensor basis for the infinitesimal generators of the exceptional groups, 8:34889 (R:XA)
LIFE SHORTENING
See LIFE SPAN
LIFE SPAN
Delayed Radiation Effects
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA:US)
LIGANDS
Chemical Preparation
New sequestering agents for the actinides, 8:34206 (RA:US)
LIGHT BULBS
Thermal Radiation
Spectrally selective films for IR-reflectance of lamp bulbs, 8:33972 (R:SE:In Swedish)
LIGHT WATER COOLED REACTORS
See WATER COOLED REACTORS
LIGHTNING ARRESTERS
Performance
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
LIGNITE
Briquetting
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Coal Gasification
Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal, 8:33707 (R:DE:In German)
Combustion
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Drying
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Steam/hot-water drying of lignite. Part I. Activities at the University of North Dakota hot-water drying of lignite to produce slurries, 8:33079 (R:US)
Fluidized-Bed Combustion
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Storage
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
LIME-LIMESTONE WET SCRUBBING PROCESSES
Additives
Buffer additives for limestone scrubbing: a review of R and D results, 8:33037 (RA:US)
Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA:US)
Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems, 8:33051 (RA:US)
Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers, 8:33038 (RA:US)
By-Products
Utilization of FGD by-product gypsum, 8:33043 (RA:US)
Comparative Evaluations
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)
Cost
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Evaluation
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
Installation
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Maintenance
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Materials
Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA:US)

Operation
Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA:US)
Water Supply
FGD chemistry and water integration, 8:33033 (RA:US)
LIMESTONE
SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA:US)
Catalytic Effects
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)
LIMESTONE DUAL ALKALI DESULFURIZATION PRO
See CEA-ADL DUAL ALKALI PROCESS
LIMITERS
Electromagnetic Fields
Electromagnetic effects on the FED/INTOR limiter, 8:34920 (R:US)
Sputtering
Charge state of sputtered impurity ions near a limiter or divertor in a tokamak, 8:34909 (R:US)
LIMNOLOGY
Longterm dissolved and particulate alkaline phosphatase activity in a hardwater lake in relation to lake stability and phosphorus enrichments, 8:34447 (J:DE)
LINACS
See LINEAR ACCELERATORS
LINEAR ACCELERATORS
See also QUADRUPOLE LINACS
Accelerator Facilities
Report of the Panel on Electron Accelerator Facilities, DOE/NSF Nuclear Science Advisory Committee, 8:34312 (R:US)
Beam Optics
Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept, 8:34282 (R:US)
Beam Splitting
Four-way rf beam separator, 8:34293 (R:US)
Heavy Ion Accelerators
Long-pulse induction acceleration of heavy ions, 8:34270 (R:US)
Induction
Long-pulse induction acceleration of heavy ions, 8:34270 (R:US)
Miniaturization
Coming in close with Minac, 8:33731 (J:US)
Neutron Source Facilities
Performance improvements of the Geel Linac neutron source, 8:34351 (J:US)
Particle Boosters
Argonne Tandem-Linac Accelerator System, 8:34307 (R:US)
Status report on the cryogenic linear accelerator booster project at Florida State University (12MV booster following FN tandem Van de Graaff), 8:34334 (BA:US)
Research Programs
Coming in close with Minac, 8:33731 (J:US)
Superconducting Cavity Resonators
Argonne Tandem-Linac Accelerator System, 8:34307 (R:US)
Tuning
Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept, 8:34282 (R:US)
LINEAR ENERGY TRANSFER
See LET
LINEAR Z PINCH DEVICES
Neutron Spectra
Theory of neutron spectra from d-d-reactions in the linear z-pinch and the plasma focus, 8:34897 (R:DE)
LINGEN REACTOR
Decommissioning
Report on the 18th business year 1981, 8:34466 (R:DE:In German)
LIPIDS
See also LIPOPROTEINS
PHOSPHOLIPIDS
Chemical Radiation Effects
Some effects of enhanced UV-B radiation on surface lipids of Cucumis sativus cotyledons, 8:34581 (RA:DE)
LIPOPROTEINS
Biochemistry
Abnormalities in low density and high density lipoprotein subspecies in familial combined hyperlipidemia, 8:34483 (RA:US)
Coordinate changes in levels of serum low and high density lipoprotein subclasses, 8:34484 (RA:US)
Model precursors to high density lipoproteins, 8:34485 (RA:US)
Calibration Standards
Plasma lipoprotein stability and standardization, 8:34058 (RA:US)
Centrifugation
Sedimentation equilibrium of human low density lipoprotein subfractions, 8:34482 (RA:US)
Quantitative Chemical Analysis
Calibration of the analytic ultracentrifuge, 8:34057 (RA:US)
Radioimmunoassay
Apolipoprotein E in umbilical cord blood plasma, 8:34552 (RA:US)
Spatial Distribution
Use of low density lipoprotein (LDL) colloidal gold complexes to study the distribution of low density lipoproteins on cell surfaces, 8:34481 (RA:US)
LIQUEFIED NATURAL GAS
Transport
Feasibility study of a sealed safety monitor for trucks carrying LNG and other hazardous materials, 8:33165 (R:US)
LIQUEFIERS
See CONDENSERS
LIQUID ASPHALT
See PETROLEUM RESIDUES
LIQUID COLUMN CHROMATOGRAPHY
Comments on column characterization: a sulfur column, 8:34069 (J:DE)
Accuracy
Evaluation of quantitative precision in high performance liquid chromatography, 8:34070 (J:US)
Equipment
Capillary column supercritical fluid chromatography/mass spectrometry, 8:34064 (J:US)
LIQUID CONTAMINATION MONITORS
Monitoring of deactivation stations in nuclear power plants, 8:34376 (RA:CS:In Czech)
LIQUID CRYSTALS
Shear Properties
Shear mechanical properties of free-standard liquid crystal films, 8:34154 (BA:US)
LIQUID DROP MODEL
Legendre Polynomials
Classifying the singularity in the deformation shape of the liquid-drop model, 8:34847 (J:IT)
LIQUID FUELS
See also FUEL OILS
GASOHOL
GASOLINE
Ignition
Study on the ignition of a fuel droplet in high temperature stagnant gas, 8:34211 (R:US)
LIQUID METAL TEST FACILITIES
See TEST FACILITIES
LIQUID SCINTILLATION DETECTORS
Particle Discrimination
Possibility of p,chemical bond discrimination in a NE213 liquid scintillator, 8:34356 (RA:IL)
LIQUIDS
See also COAL LIQUIDS
LIQUID CRYSTALS
Mixing
Thermomechanical theory for reacting immiscible mixtures, 8:34145 (J:DE)

Phase Transformations
Phase separation in transparent liquid-liquid miscibility gap systems, 8:34740 (R:US)
Raman Spectra
Picosecond studies of vibrational linewidth broadening in liquids, 8:34091 (R:US)

LITHIUM
Desorption
Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J:NL)
Electron Spin Resonance
Ab initio calculation of the structures and properties of some lithium-Lewis base complexes, 8:34126 (J:US)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)

LITHIUM 6 TARGET
Deuteron Reactions
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
Helium 3 Reactions
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
Neutron Reactions
Measurement of the ^{10}B/^{6}Li cross section ratio below 1 keV, 8:34802 (J:US)
Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV, 8:34801 (J:US)
Proton Reactions
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)

LITHIUM 7 TARGET
Neutron Reactions
Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV, 8:34801 (J:US)
Oxygen 18 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)

LITHIUM COMPLEXES
Electron Spin Resonance
Ab initio calculation of the structures and properties of some lithium-Lewis base complexes, 8:34126 (J:US)
Structural Chemical Analysis
Ab initio calculation of the structures and properties of some lithium-Lewis base complexes, 8:34126 (J:US)

LITHIUM IONS
Auger Electron Spectroscopy
Inner-shell x-ray and auger spectroscopy: manifestation of the Breit interaction in properties of few-hole and few-electron atomic systems, 8:34712 (RA:US)
Ion-Atom Collisions
Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy, 8:34726 (R:JP)
X-Ray Spectroscopy
Inner-shell x-ray and auger spectroscopy: manifestation of the Breit interaction in properties of few-hole and few-electron atomic systems, 8:34712 (RA:US)

LITHIUM SULFATES
Excitation
Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures, 8:34134 (J:GB)
Raman Spectra
Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures, 8:34134 (J:GB)

LITHIUM SULFIDES
Entropy
Cluster-variation method for the triangular lattice gas, 8:34105 (J:GB)
Phase Diagrams
Cluster-variation method for the triangular lattice gas, 8:34105 (J:GB)

LMFBR TYPE REACTORS
See also CLINCH RIVER BREEDER REACTOR
Breeding Blankets
Gamma-ray heating in the Fast Breeder Blanket Facility, 8:33690 (J:US)
Fuel Pins
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R:US)
Pipes
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Primary Coolant Circuits
Theory and application of a three-dimensional code SHAPS to complex piping systems, 8:33740 (R:US)
Pumps
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Reactor Core Disruption
Theory and application of a three-dimensional code SHAPS to complex piping systems, 8:33740 (R:US)
Reactor Cores
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
Reactor Safety
Nuclear reactor safety. Progress report, July 1-October 31, 1982 (Los Alamos National Laboratory), 8:33759 (R:US)
Reactor Vessels
Seismic response of large suspended tanks, 8:33741 (R:US)
Steam Generators
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Technology Assessment
Collection of arguments for and against the construction of Fast Breeder Reactors in underground nuclear facilities, 8:34471 (R:DE:In German)

LNG
See LIQUEFIED NATURAL GAS

LOAD (DYNAMIC)
See DYNAMIC LOADS

LOCA
See LOSS OF COOLANT

LOGGING WHILE DRILLING
See MWD SYSTEMS

LONGITUDINAL PINCH DEVICES (LINEAR)
See LINEAR Z PINCH DEVICES

LOOPS (COOLANT)
See COOLANT LOOPS

LOS ALAMOS SCIENTIFIC LABORATORY
See LASL

LOSS OF COOLANT
Heat Transfer
BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R:US)
Hydraulics
BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R:US)
Test Facilities
BWR Refill-Reflood Program. Task 4.4: CCFL/refill-system effects tests (30° sector). SSTF system response test results, 8:33756 (R:US)

LOUISIANA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

LOW LEVEL COUNTERS
Design
Design and testing of the measuring equipment for the detection of ^{71}Ge and ^{68}Ge within the gallium-solar-neutrino experiment, 8:34533 (R:DE:In German)
Performance Testing
Design and testing of the measuring equipment for the detection of ^{71}Ge and ^{68}Ge within the gallium-solar-neutrino experiment, 8:34533 (R:DE:In German)

LOW-LEVEL RADIOACTIVE WASTES
Environmental Transport
Computerized methodology for evaluating the long-range radiological impact of shallow-land burial, 8:33195 (RA:US)

Laws
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Legislation
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Radioactive Waste Management
Department of Energy Low-Level Waste Management Program, 8:33226 (RA:US)
Radioactive Waste Storage
Low-level waste research and development program, 8:33225 (RA:US)
Research Programs
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
Underground Disposal
Low-level waste research and development program, 8:33225 (RA:US)

LTH
Biochemistry
Thyroid hormone studies after ozone exposure, 8:34618 (RA:US)

LUMBER INDUSTRY
See WOOD PRODUCTS INDUSTRY

LUNAR MATERIALS
Chemical Composition
Candidate samples for the earliest lunar crust, 8:34695 (BA:US)

LUNG CELLS
See RESPIRATORY TRACT CELLS

LUNGS
Biochemistry
Identification of androgen receptors in the male mouse lung, 8:34479 (RA:US)

LURGI PROCESS
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983 (Mercer County, ND), 8:32949 (R:US)

LUTEOTROPIC HORMONE
See LTH

LUTETIUM 175 TARGET
Neutron Reactions
Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J:US)
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J:US)

LUTETIUM 176 TARGET
Neutron Reactions
Measurement of Maxwellian averaged capture cross sections for ^{138}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J:US)

LUXEMBOURG
Energy Policy
Luxembourg - energy situation 1981, 8:33837 (R:DE:In German)
Energy Supplies
Luxembourg - energy situation 1981, 8:33837 (R:DE:In German)

LWBR TYPE REACTORS
Fuel Assembly Dismantling
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Spent Fuel Elements
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)

LWR TYPE REACTORS
See WATER COOLED REACTORS

LYMPH VESSELS
Biomedical Radiography
Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R:DE:In German)

LYMPHOCYTES
Chromosomal Aberrations
Intrinsic factors that can affect sensitivity to chromosome-aberration induction, 8:34573 (R:US)
Sensitivity
Intrinsic factors that can affect sensitivity to chromosome-aberration induction, 8:34573 (R:US)

LYMPHOID CELLS
See LYMPHOCYTES

M

MA 754
See NICKEL BASE ALLOYS

MA 956
See IRON BASE ALLOYS

MACHINE TOOLS
Computer Graphics
Emulation of multi-axis numerically controlled machine tools, 8:34226 (R:US)
Computerized Control Systems
Emulation of multi-axis numerically controlled machine tools, 8:34226 (R:US)

MADAGASCAR
Energy Policy
Madagascar - energy situation 1981, 8:33840 (R:DE:In German)

MAGNESIUM
Binding Energy
Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics, 8:34124 (J:NL)

MAGNESIUM 24 REACTIONS
Resonance
Resonances in heavy systems, 8:34806 (R:US)

MAGNESIUM 24 TARGET
Magnesium 24 Reactions
Resonances in heavy systems, 8:34806 (R:US)

MAGNESIUM 29
Search for new isotopes at Brookhaven, 8:34809 (J:US)

MAGNESIUM COMPOUNDS
See also MAGNESIUM OXIDES
Biological Effects
Initial growth rate, population density, and cation content as limiting factors in the multiplication of nontransformed and transformed 3T3 cells, 8:34500 (BA:US)

MAGNESIUM OXIDES
Corrosion Resistance
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)

MAGNET COILS
Design
Magnetic-coil optimization for quadrupole-stabilized mirror systems, 8:34938 (R:US)

MAGNETIC COILS
See MAGNET COILS

MAGNETIC FIELDS
Biological Effects
Biological effects of magnetic fields, 8:34664 (RA:US)

MAGNETIC MATERIALS
Muon Probes
Possibility of studying crystal-field levels and excitations by μi SR spectroscopy, 8:34864 (R:US)

MAGNETIC MIRROR CONFIGURATIONS
Ambipolar Diffusion
Axisymmetric ambipolar trap, 8:34908 (TG:US)

MAGNETIC MIRROR TYPE REACTORS
See also MARS REACTOR

Breeding Blankets
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
First Wall
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
Shielding
Overview of first wall/blanket/shield technology, 8:34915 (R:US)

MAGNETIC REFRIGERATORS
Regenerators
Theory of an active magnetic regenerative refrigerator, 8:34220 (R:US)

MAGNETIC SPECTROMETERS
Mechanical Structures
Magnet coil system for a superconducting spectrometer (HISS), 8:34315 (R:US)
Operation
Operation of the AFS at $L = 1.4 \times 10^{33}\ cm^{-2}\ sec^{-1}$: a first look at data at high luminosity from the CERN ISR (Axial Field Spectrometer), 8:34301 (R:US)
Positrons
Emission spectrum of a positron source on the base of ^{22}Na, 8:34536 (RA:SU:In Russian)
Superconducting Magnets
Magnet coil system for a superconducting spectrometer (HISS), 8:34315 (R:US)
Technology Assessment
Device for study on the (p, pn) reactions, 8:34537 (RA:SU:In Russian)

MAGNETISM
Randomness
Random magnetism, 8:34877 (RA:BR)
Topology
Random magnetism, 8:34877 (RA:BR)

MAGNETOHYDRODYNAMIC GENERATORS
See MHD GENERATORS

MAGNETOSPHERE
Electric Currents
Field-aligned currents near the magnetosphere boundary, 8:34696 (R:US)

MAGNETOTELLURIC SURVEYS
Process and technology development activities for in-situ coal gasification, FY 82, 8:32995 (R:US)

MAHOGANY TREES
See TREES

MAINE
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

MAIZE
Photosynthesis
Critical reassessment of the photosystem II content in bundle sheath chloroplasts of young leaves of Zea mays, 8:34492 (BA:US)

MALFORMATIONS
Radiotherapy
Stereotactic heavy-ion irradiation of intracranial vascular disorders, 8:34547 (RA:US)

MALIGNANCIES
See NEOPLASMS

MAMMALS
See also HORSES
Genetics
Mammalian mutagenesis: future directions, 8:34505 (BA:US)
Mutagenesis
Mammalian mutagenesis: future directions, 8:34505 (BA:US)

MAMMARY GLANDS
Biomedical Radiography
Reliability and accuracy of mammography in the diagnosis of breast carcinomas, 8:34532 (R:DE:In German)
Cytology
Extracellular matrix influences on gene expression: the role of matrix components in modulating the differentiated phenotype of mammary epithelial cells, 8:34498 (RA:US)

MAN
All of mankind, of any age or of either sex.
See also MEN
WOMEN
Behavior
Decisionmaking organizations with acyclical information structures. Technical report, 8:34476 (R:US)
Environmental Exposure Pathway
PABLM: a computer code to compute accumulated radiation doses from radionuclides transported to aquatic and terrestrial pathways in the biosphere, 8:33251 (R:US)
Radiation Doses
PABLM: a computer code to compute accumulated radiation doses from radionuclides transported to aquatic and terrestrial pathways in the biosphere, 8:33251 (R:US)

MANGANESE NITRATES
NMR Spectra
Nuclear magnetic resonance, paramagnetic ion induced relaxation method to differentiate between 1,3-diketo and 1,3-keto-enol isomers, 8:34131 (J:US)

MANGANESE STEELS
Mechanical Properties
Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R:US)
Microstructure
Microstructure-mechanical property relationships of martensite and lower bainite in a 0.3%C-3%Cr-2% Mn steel, 8:33964 (R:US)

MANNOMUSTINE
See ALKYLATING AGENTS

MANUFACTURING FACILITIES
See INDUSTRIAL PLANTS

MANURES
Anaerobic Digestion
How much is a biogas system to cost. Operational evaluation of biogas in agriculture, 8:33348 (R:DK:In Danish)

MARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS

MARS REACTOR
Design
Mirror Advanced Reactor Study interim design report, 8:34945 (R:US)

MARYLAND
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

MASKS
See RESPIRATORS

MASS SPECTROSCOPY
Equipment
Capillary column supercritical fluid chromatography/mass spectrometry, 8:34064 (J:US)

MASS TRANSIT SYSTEMS
Bibliographies
Urban mass transportation abstracts, 8:33929 (J:US)

MASSACHUSETTS
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

MASSLESS PARTICLES
Locality
Localizability of massless particles in the framework of the conformal group, 8:34891 (R:XA)

MATERIALS
See also BIOLOGICAL MATERIALS
BUILDING MATERIALS
CARBONACEOUS MATERIALS
COMPOSITE MATERIALS
DIELECTRIC MATERIALS
GLAZING MATERIALS
HAZARDOUS MATERIALS

LUNAR MATERIALS
MAGNETIC MATERIALS
PHASE CHANGE MATERIALS
RADIOACTIVE MATERIALS
REACTOR MATERIALS
REINFORCED MATERIALS
SEMICONDUCTOR MATERIALS
TOXIC MATERIALS

Research Programs
Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R:US)

MATERIALS (BIOLOGICAL)
See BIOLOGICAL MATERIALS

MATERIALS (BUILDING)
See BUILDING MATERIALS

MATERIALS (COMPOSITE)
See COMPOSITE MATERIALS

MATERIALS (DIELECTRIC)
See DIELECTRIC MATERIALS

MATERIALS (LUNAR)
See LUNAR MATERIALS

MATERIALS (MAGNETIC)
See MAGNETIC MATERIALS

MATERIALS (REINFORCED)
See REINFORCED MATERIALS

MATERIALS (SEMICONDUCTOR)
See SEMICONDUCTOR MATERIALS

MATERIALS TESTING
Equipment
Development of a load cell for mechanical testing in hydrogen, 8:33959 (R:US)

MATHEMATICAL MODELS
See also COSMOLOGICAL MODELS
NUCLEAR MODELS
PARTICLE MODELS
STATISTICAL MODELS
Evaluation
Representativeness of calculated peak and annual average concentrations, 8:34413 (R:US)

MATHEMATICS
See also GEOMETRY
Singularity
Breakdown of predictability: an investigation on the nature of singularities, 8:34888 (R:XA)

MATRICES
LU decomposition of M-matrices by elimination without pivoting, 8:34977 (J:US)

MEASUREMENTS WHILE DRILLING
See MWD SYSTEMS

MEASURING INSTRUMENTS
Use of a more specific term is recommended.
See also ANEMOMETERS
DOSEMETERS
ELLIPSOMETERS
INTERFEROMETERS
LEVEL INDICATORS
PHOTOMETERS
RADIATION DETECTORS
SPECTROMETERS
Meetings
Seminar on nuclear methods in mining, geology, geophysics, and geochemistry. Abstracts of papers, 8:34675 (R:CS)

MEAT
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)

MECHANICAL STRUCTURES
See also BELLOWS
SUPPORTS
Static Loads
Program for the ultimate static load of spatial steel frames, 8:34219 (R:DE:In German)
Stress Analysis
Program for the ultimate static load of spatial steel frames, 8:34219 (R:DE:In German)

MECHANICAL VIBRATIONS
Pattern Recognition
Hierarchically structured identification and classification method for vibration control of reactor components, 8:34465 (R:DE:In German)

MEIOSIS
Comparative Evaluations
Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae, 8:34504 (RA:US)

MELANOCYTES
See ANIMAL CELLS

MELTDOWN
Pressure Gradients
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)

MELTING
Research Programs
Experimental studies of two dimensional melting, 8:34153 (BA:US)

MEN
Whole-Body Irradiation
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R:US)

MENTAL DISORDERS
Diagnosis
Positron imaging studies in Alzheimer-type dementia, 8:34543 (RA:US)

MERCURY
Environmental Transport
Emission of mercury from an ash disposal, 8:33063 (R:SE:In Swedish)
Personnel Dosimetry
Personal passive monitors for chemical agents. Technical report, 8:34404 (R:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Toxicity
Neurological aspects of mercury intoxication, 8:34625 (R:DE:In German)
Personal passive monitors for chemical agents. Technical report, 8:34404 (R:US)

MESON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET

MESONS
Gluons
QCD sum rules of the Laplace transform type for the gluon component of the U(1)sub(A) meson mass, 8:34759 (R:XA)
Mass
QCD sum rules of the Laplace transform type for the gluon component of the U(1)sub(A) meson mass, 8:34759 (R:XA)

METABOLIC DISEASES
Biochemistry
Abnormalities in low density and high density lipoprotein subspecies in familial combined hyperlipidemia, 8:34483 (RA:US)

METAGALAXY
See UNIVERSE

METAL INDUSTRY
Wages
Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R:US)
Waste Heat Utilization
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 2, 8:33932 (R:DE:In German)
Utilization of industrial waste heat citing an integrated iron and steel works as an example to save primary energy and reduce the burden on the environment. Vol. 1, 8:33931 (R:DE:In German)

METALLOTHIONEIN
Biosynthesis
Zinc-induced resistance to alkylating agents: lack of correlation between cell survival and metallothionein content, 8:34641 (J:US)

Genes
Coordinate amplification of metallothionein I and II gene sequences in cadmium-resistant CHO variants, 8:34617 (R:US)

METALS
See also ACTINIDES
ALUMINIUM
CADMIUM
LEAD
MERCURY
THALLIUM
ZINC

Chemical Reactions
Modelling and scaleup of dispersed phase liquid-liquid reactors, 8:34160 (J:GB)

Corrosion
Mechanism of corrosion in multiple component gases at high temperatures, 8:33977 (BA:US)

Erosion
Erosion of metal alloys and their scales, 8:33978 (BA:US)

Geochemistry
Earth sciences, 8:34677 (RA:US)

Infrared Spectra
Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts, 8:34171 (J:US)

Microanalysis
Limitations of AEM-based x-ray microanalysis, 8:34079 (BA:US)

Research Programs
Metals and Ceramics Division. Progress report for period ending December 31, 1982, 8:33953 (R:US)

METAPHASE
See MITOSIS

METASTASES

Diagnosis
Study of cerebral metastases by means of computerized tomography, 8:34535 (R:DE:In German)

METEOROLOGY

Data Transmission Systems
Automatic meteorological station system AN/TMQ-30 ( ). Final report, 8:34393 (R:US)

Research Programs
Radar meteorology in cloud physics and radio wave propagation research, 8:34394 (R:DE:In German)

METHANATION

Optimization
Optimization of fixed bed methanation processes, 8:33271 (J:US)

METHANE

Adsorption
Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R:US)

Anaerobic Digestion
Methane fermentations. End product inhibition, thermophilic methane formation and production of methane from algae, 8:33329 (R:SE)

Biosynthesis
How much is a biogas system to cost. Operational evaluation of biogas in agriculture, 8:33348 (R:DK:In Danish)

Decomposition
Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J:NL)

Desorption
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)

Drainage
Site-specific and regional geologic considerations for coalbed gas drainage. Information circular/1982, 8:33078 (R:US)

Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)

Fuel Substitution
Utilizing the unconventional gas resources of the Pottsville Formation coals in Tuscaloosa County, Alabama, 8:33159 (R:US)

Ignition
Experimental investigation of shock initiated methane-combustion near a wall, 8:33264 (R:DE)

Melting
Experimental studies of two dimensional melting, 8:34153 (BA:US)

Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)

Recovery
Applications manual for analyzing landfill methane-recovery data using the Computer Analysis of Field Data (CAFD) interactive graphics system, 8:33940 (R:US)

Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)

Separation Processes
Separation of helium-methane mixtures by pressure-swing adsorption, 8:34052 (R:US)

Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)

METHANOGENIC BACTERIA
Biological paramagnetic center: octahedrally coordinated nickel(III) in the methanogenic bacteria, 8:34097 (J:US)

METHANOL

Adsorption
Chemical properties of anion vacancies on zinc oxide, 8:34006 (J:NL)

Cost
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R:SE:In Swedish)
Updating of costs for production of methanol from natural gas and vacuum residue feedstock, 8:33160 (R:SE)

Dielectric Properties
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)

Production
Fusion-reduction of iron combined with the production of methanol. Final report, 8:33012 (R:SE:In Swedish)

METHANOL PLANTS

Economic Analysis
Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA:US)

METHYL ALCOHOL
See METHANOL

METHYL IODIDE

Adsorption
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R:AT:In German)

METHYL METHACRYLATE

Photolysis
Photoprocesses in copolymers of methacrylophenone with methyl methacrylate: photodegradation and intramolecular energy migration, 8:34180 (J:US)

METHYL NITRATE
See NITRIC ACID ESTERS

METHYL VIOLOGEN
See BIPYRIDINES

METHYL-FUEL
See METHANOL

METROPOLITAN AREAS
See URBAN AREAS

MEXICO

Energy Policy
Mexico - energy situation 1981, 8:33790 (R:DE:In German)

Energy Supplies
Mexico - energy situation 1981, 8:33790 (R:DE:In German)

MFTF DEVICES
Prior to October 1977, MX DEVICES was used to index this concept.

Design
Technology demonstration report for the Mirror Fusion Test Facility (MFTF-B), 8:34946 (R:US)
Feasibility Studies
Technology demonstration report for the Mirror Fusion Test Facility (MFTF-B), 8:34946 (R:US)
Research Programs
Mirror fusion. Quarterly report, July-September 1982, 8:34944 (R:US)

MHD GENERATORS
See also COAL-FIRED MHD GENERATORS
OPEN-CYCLE MHD GENERATORS
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)

MICE
Biological Radiation Effects
Donner Clinic: kinetics of megakaryocyte and platelet turnover, 8:34589 (RA:US)
Sensitivity
Strain differences and solvent effects in mouse skin carcinogenesis experiments using carcinogens, tumor initiators, and promoters, 8:34616 (R:US)

MICELLAR-POLYMER FLOODING
See MICROEMULSION FLOODING

MICHIGAN
Energy Consumption
Michigan residential heating oil survey, winter 1982/83. Final report, 8:33853 (R:US)
Heating Oils
Michigan residential heating oil survey, winter 1982/83. Final report, 8:33853 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

MICROANALYSIS
Sensitivity
Limitations of AEM-based x-ray microanalysis, 8:34079 (BA:US)

MICROBIAL ENHANCED OIL RECOVERY
See MICROBIAL EOR

MICROBIAL EOR
Bacteria
Growth and biosurfactant production of a bacteria in continuous culture, 8:33105 (RA:US)
Bench-Scale Experiments
Barobiology of deep oil formations, 8:33119 (RA:US)
Biosurfactants and enhanced oil recovery, 8:33117 (RA:US)
Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery, 8:33118 (RA:US)
International conference on microbial enhancement of oil recovery, 8:33104 (R:US)
Investigation of the transport of bacteria through porous media, 8:33110 (RA:US)
Isolation and screening of Clostridia for possible use in microbially enhanced oil recovery, 8:33109 (RA:US)
Microbial processes in the recovery of heavy petroleum, 8:33115 (RA:US)
Microbial enhancement of oil recovery in Romania, 8:33122 (RA:US)
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA:US)
Potential for use of microbes in the production of heavy oil, 8:33114 (RA:US)
Some constraints on the use of bacteria in enhanced oil recovery, 8:33125 (RA:US)
Survey of research on the application of microbial techniques to the petroleum production in China, 8:33121 (RA:US)
Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA:US)
Feasibility Studies
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Field Tests
International conference on microbial enhancement of oil recovery, 8:33104 (R:US)
Microbial enhancement of oil recovery in Romania, 8:33122 (RA:US)
Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas, 8:33123 (RA:US)
Petroleum microbiology and the history of its role in enhanced oil recovery, 8:33126 (RA:US)
Survey of research on the application of microbial techniques to the petroleum production in China, 8:33121 (RA:US)
Meetings
International conference on microbial enhancement of oil recovery, 8:33104 (R:US)
Microorganisms
Investigation of the transport of bacteria through porous media, 8:33110 (RA:US)
Isolation and screening of Clostridia for possible use in microbially enhanced oil recovery, 8:33109 (RA:US)
Microbial processes in the recovery of heavy petroleum, 8:33115 (RA:US)
Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA:US)
Microbial interactions with polyacrylamide polymers, 8:33120 (RA:US)
Physiological types of microorganisms useful for enhanced oil recovery, 8:33108 (RA:US)
Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA:US)
Potential for use of microbes in the production of heavy oil, 8:33114 (RA:US)
Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA:US)
Reviews
Petroleum microbiology and the history of its role in enhanced oil recovery, 8:33126 (RA:US)
Simulation
Combined effects of temperature and other environmental stresses on microbiologically enhanced oil recovery, 8:33118 (RA:US)

MICROBIAL FLORA
See MICROORGANISMS

MICROCEPHALY
See MALFORMATIONS

MICROCOMPUTERS
See MICROPROCESSORS

MICROEMULSION FLOODING
Surfactants
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)

MICROFLORA
See MICROORGANISMS

MICROORGANISMS
See also BACTERIA
VIRUSES
Biological Radiation Effects
Microorganisms as dosimeter for solar UV-radiation, 8:34578 (RA:DE)
Environmental Transport
Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA:US)
Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA:US)
Growth
Physiological types of microorganisms useful for enhanced oil recovery, 8:33108 (RA:US)

Metabolism
Physiological types of microorganisms useful for enhanced oil recovery, 8:33108 (RA:US)
Screening
Survey of research on the application of microbial techniques to the petroleum production in China, 8:33121 (RA:US)
Ultraviolet Radiation
Microorganisms as dosimeter for solar UV-radiation, 8:34578 (RA:DE)

MICROPROCESSORS
Programming
A2900 meta assembler user manual, 8:34968 (R:US)
Assembler routines for process-control using the microcomputers Commodore cbm 3032/4032/8032, 8:34965 (R:DE:In German)

MICROTRONS
Uses
Application of accelerators for solution of the national economy problems, 8:34266 (RA:SU:In Russian)

MIDWEST REGION
See FEDERAL REGION VII

MIGRATION (RADIONUCLIDE)
See RADIONUCLIDE MIGRATION

MILITARY EQUIPMENT
Tires
Field evaluation of tank track-pad failures, 8:34214 (R:US)

MILK
Heat Recovery
Refrigeration of milk - heating of dwelling-houses. Experimental evidence, 8:33936 (R:SE:In Swedish)
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)

MILL TAILINGS
Chemical Composition
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)
Coverings
Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R:US)
Grouting
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)
Land Reclamation
Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R:US)
Leaching
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)
Management
Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R:US)
Physical Properties
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)
Stabilization
Environmental impacts program, 8:33066 (RA:US)
In-situ grouting of uranium-mill-tailings piles: an assessment, 8:33228 (R:US)

MINE ROADWAYS
Supports
Fundamental examinations for the mechanisation of the support work in headings by blasting and by using selective cut heading machines, 8:34258 (R:DE:In German)

MINE-MOUTH GENERATING PLANTS
See COAL MINES
FOSSIL-FUEL POWER PLANTS

MINERAL CYCLING
Seasonal Variations
Aquatic ecology section, 8:34454 (RA:US)

MINERALS
Catalytic Effects
Investigations on the influence of mineral matter of coals and cokes on the kinetics of gasification with hydrogen and water vapour, 8:33014 (R:DE:In German)
Neutron-Gamma Logging
Neutron induced radioactivity for mineral exploration, 8:34390 (J:US)
Production
Production and consumption of non-fuel minerals to the year 2030 analyzed within an input-output framework of the US and world economy (techniques for consistent forecasting of future demand for major minerals using an input-output framework), 8:33793 (R:US)
Solubility
Geothermal-brine modeling - prediction of mineral solubilities in natural waters: the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3 CO_3-CO_2-H_2O system to high ionic strengths at 25°C, 8:33577 (R:US)

MINERS
Biological Stress
Investigation on the stress of miners by dry and hot climatic conditions, 8:34610 (R:DE:In German)
Occupational Diseases
Dark epithelial cells in preneoplastic lesions of the human respiratory tract, 8:34638 (J:US)
Temperature Effects
Investigation on the stress of miners by dry and hot climatic conditions, 8:34610 (R:DE:In German)
Working Conditions
Investigation on the stress of miners by dry and hot climatic conditions, 8:34610 (R:DE:In German)

MINING
See also COAL MINING
SURFACE MINING
UNDERGROUND MINING
Meetings
Seminar on nuclear methods in mining, geology, geophysics, and geochemistry. Abstracts of papers, 8:34675 (R:CS)

MINKOWSKI SPACE
Conformal Invariance
Invariant systems under the space-time inversion. Existence of the two kinds of the invesions, 8:34884 (R:JP)

MINNESOTA
District Heating
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

MIRROR ADVANCED REACTOR STUDY
See MARS REACTOR

MIRROR FUSION TEST FACILITY
See MFTF DEVICES

MISGURNUS
See FISHES

MISSISSIPPI
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)

MISSOURI
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)

Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
MITOSIS
Comparative Evaluations
Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae, 8:34504 (RA:US)
MIXED BED ION EXCHANGERS
Regeneration
New trends in development of instrumentation for ion exchange purification of radioactive liquid wastes, 8:33220 (RA:CS:In Czech)
MIXED OXIDE FUELS
Uranium dioxide mixed with other oxides.
Post-Irradiation Examination
Power ramp experiments with mixed oxide (UO_2/PuO_2) fuel rods, 8:33727 (R:DE:In German)
MIXING
Not for CONFIGURATION MIXING.
Mathematical Models
Thermomechanical theory for reacting immiscible mixtures, 8:34145 (J:DE)
MIXTURES
See also SLURRIES
Breakdown
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA:US)
Corona Discharges
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Nitrogen
Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA:US)
Sulfur Fluorides
Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA:US)
MODELS (COSMOLOGICAL)
See COSMOLOGICAL MODELS
MODELS (MATHEMATICAL)
See MATHEMATICAL MODELS
MODELS (NUCLEAR)
See NUCLEAR MODELS
MODELS (PARTICLE)
See PARTICLE MODELS
MODELS (STATISTICAL)
See STATISTICAL MODELS
MODERATING DETECTORS
See also BONNER SPHERE DETECTORS
Efficiency
Monte Carlo calculation of energy dependence for efficiency of moderating neutron detectors, 8:34365 (RA:CS:In Slovak)
MOESSBAUER EFFECT
Modulation
Investigation of the Moessbauer spectrum shape on coherent acoustic excitation, 8:34541 (RA:SU:In Russian)
Structural Chemical Analysis
Moessbauer spectra processing by the method of distribution function reconstruction by means of quadrupolar splitting, 8:34542 (RA:SU:In Russian)
MOLASSES
Fermentation
Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas, 8:33123 (RA:US)
MOLDS
See FUNGI
MOLECULAR BEAMS
Chemical Reactions
Activation of chemical reaction by impact of molecules on a surface, 8:34161 (J:US)
MOLECULAR ORBITAL MODEL
See MOLECULES
MOLECULAR STRUCTURE
Computer Calculations
Supercomputer requirements for theoretical chemistry, 8:34168 (J:US)
Computerized Simulation
Computer studies of multiple-quantum spin dynamics, 8:34881 (R:US)
MOLECULES
See also POLYATOMIC MOLECULES
Hydration
Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces, 8:34121 (J:US)
L-S Coupling
Ab initio effective core potentials including relativisitc effects: a procedure for the inclusion of spin-orbit coupling in molecular wavefunctions, 8:34119 (J:NL)
Oscillator Strengths
Rules for S(-2k) dipole sums, 8:34733 (J:DE)
Quantum Mechanics
Quasiperiodic and stochastic behavior in molecules, 8:34732 (J:US)
Stochastic Processes
Quasiperiodic and stochastic behavior in molecules, 8:34732 (J:US)
Wave Functions
Ab initio effective core potentials including relativisitc effects: a procedure for the inclusion of spin-orbit coupling in molecular wavefunctions, 8:34119 (J:NL)
MOLTEN CARBONATE FUEL CELLS
Prior to June 1980 this information was indexed with the descriptors HIGH-TEMPERATURE FUEL CELLS + MOLTEN SALTS + CARBONATES.
Design
Advanced fuel-cell concepts for the 0.1- to 100-MW range, 8:33882 (R:US)
Fuel Gas
Development of a hot-gas cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 1, October 1-December 31, 1982, 8:32952 (R:US)
MOLYBDENUM
Adsorption
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
Catalytic Effects
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J:US)
Crystal Structure
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Fluorescence Spectroscopy
Laser fluorescence spectroscopy of molecular molybdenum isolated in rare gas matrices, 8:33988 (J:US)
Laser Spectroscopy
Laser fluorescence spectroscopy of molecular molybdenum isolated in rare gas matrices, 8:33988 (J:US)
Surface Properties
Moessbauer and Auger spectroscopic studies of supported and sulfided Fe-Mo hydrodesulfurization catalysts, 8:34095 (J:US)
MOLYBDENUM ALLOYS
See also HASTELLOYS
INCONEL 738
NIMONIC PE16
RENE 41
STAINLESS STEEL-316
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Annealing
Annealing studies of amorphous alloys, 8:34247 (R:US)
Corrosion
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)

Creep
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Physical Radiation Effects
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
MOLYBDENUM SULFIDES
Catalytic Effects
Disposable catalyst for coal liquefaction, 8:33008 (J:US)
MOMENTS METHOD
Moment series for the coefficient of variation in Weibull sampling, 8:34978 (BA:US)
MONAZITES
Leaching
Leaching behavior of monazite, 8:33217 (RA:IL)
Physical Radiation Effects
Long-term stability of alpha-recoil damage in monazite, 8:33218 (RA:IL)
MONITORS (AIR POLLUTION)
See AIR POLLUTION MONITORS
MONITORS (REACTOR)
See REACTOR CONTROL SYSTEMS
MONOCLONAL ANTIBODIES
Biochemistry
Erythropoietin studies: purification from urine and production of monoclonal antibodies, 8:34480 (RA:US)
MONOSACCHARIDES
Intestinal Absorption
Intestinal transport of sugar: the energetics of epithelial pump-leak systems, 8:34568 (BA:US)
Membrane Transport
Intestinal transport of sugar: the energetics of epithelial pump-leak systems, 8:34568 (BA:US)
MONTANA
Insolation
Controlling the accuracy of solar radiation data from a low cost, 30 station network, 8:33468 (J:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
MONTE CARLO METHOD
Accuracy
Confidence limits and statistical convergence of Monte Carlo point flux estimators with unbounded variance, 8:33711 (RA:IL)
Sampling
Note on correlated sampling in Monte Carlo, 8:33721 (RA:IL)
Note on correlated sampling in Monte Carlo, 8:33722 (RA:IL)
MORGANTOWN ENERGY TECHNOLOGY CENTER
Coal Gasification
Fixed-bed gasification, 8:32953 (R:US)
MORPHOLOGICAL CHANGES
Genetic Control
Gene level control, 8:34565 (BA:US)
MOS TRANSISTORS
Metal Oxide Silicon transistors.
Physical Radiation Effects
Space-charge effects in irradiated Si_3N_4 films, 8:34384 (R:US)
MT HOOD
Magnetotelluric Surveys
Investigation of the conductivity distribution in the vicinity of a cascade volcano, 8:33557 (R:US)
Telluric Surveys
Investigation of the conductivity distribution in the vicinity of a cascade volcano, 8:33557 (R:US)
MULE DEER
See DEER
MULTICHARGED IONS
Ions with charge 3 and above. Coordinate the above descriptor with a descriptor for the specific ion.
Beam Production
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R:US)
MULTISPHERE NEUTRON DETECTORS
See BONNER SPHERE DETECTORS
MULTIWIRE PROPORTIONAL CHAMBERS
Design
Development of a low-pressure proportional chamber for particle detection in ion-X-ray-coincidence experiments and a study of inner shell differential ionisation probabilities, 8:34519 (R:DE:In German)
Track chambers for high luminosity, 8:34352 (R:US)
MUNICIPAL BUILDINGS
See PUBLIC BUILDINGS
MUNICIPAL WASTES
Anaerobic Digestion
Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R:SE:In Swedish)
Availability
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
Liquefaction
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
Recycling
Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R:SE:In Swedish)
Sorting
Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R:SE:In Swedish)
MUON PROBES
Depolarization
Magnetic-field dependence of impurity-induced muon depolarization in noble metals, 8:34865 (R:US)
MUTAGEN SCREENING
In Vivo
Need to develop a short-term Chinese hamster in-vivo specific-locus mutational assay, 8:34615 (R:US)
Optimization
Tier II mutagenic screening of 13 NIOSH priority compounds: individual compound report, n,n-dimethylformamide, 8:34634 (R:US)
Research Programs
Need to develop a short-term Chinese hamster in-vivo specific-locus mutational assay, 8:34615 (R:US)
Reviews
Evaluation of the host-mediated assay and body fluid analysis. A report of the US Environmental Protection Agency genetox program, 8:34640 (J:NL)
MUTAGENESIS
Effect of metabolic activation on the cytotoxicity and mutagenicity of 1,2-dibromoethane in the CHO/HGPRT system, 8:34639 (J:NL)
MUTAGENS
Bioassay
Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R:DE:In German)
Biological Effects
Study of the molecular basis for radiation mutagenesis. Final progress report, 8:34574 (R:US)
Cytological Techniques
Further improvement of genetic and cytogenetic test pattern with increased relevance predicting carcinogenic and pharmacological effects, 8:34613 (R:DE:In German)
MUTATIONS
Radioinduction
Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells, 8:34593 (RA:US)
Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae, 8:34504 (RA:US)
MWD SYSTEMS
Sensors and data transmission equipment for real time measurements while drilling.

Evaluation
Stress of the drilling shaft in deep-well drilling, 8:33134 (R:DE:In German)
MWPC
See MULTIWIRE PROPORTIONAL CHAMBERS
MX DEVICES
See MFTF DEVICES

N

NAHCOLITE
Comparative Evaluations
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
Sorptive Properties
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
NAI DETECTORS
Response Functions
Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers, 8:34381 (J:US)
Technology Assessment
Facility for studying radiation damage of structural materials by the differential perturbed angular correlation method, 8:34474 (RA:SU:In Russian)
NAPHTHA
Boiling point range 0-204°C.
Catalytic Reforming
Catalytic steam reforming of hydrocarbon for production of synthesis gas, 8:33269 (J:IN)
NAPHTHALENE
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Oxidation
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment (In autoclaves: 130 to 250°C; 6 to 11 MPa oxygen; in water solution), 8:32960 (R:US)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
NAPHTHENES
See CYCLOALKANES
NATIONAL SCIENCE FOUNDATION
Research Programs
Guide to programs, fiscal year 1983, 8:33809 (R:US)
NATURAL GAS
See also LIQUEFIED NATURAL GAS
Deregulation
Natural gas market through 1990, 8:33162 (R:US)
Forecasting
1982 annual energy outlook: with projections to 1990 (1982-1990), 8:33146 (R:US)
Fuel Consumption
Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs, 8:33148 (R:AT:In German)
Natural gas monthly, 8:33161 (R:US)
Legislation
Supplemental analysis of natural-gas-consumer regulatory-reform legislation, 8:33163 (R:US)
Market
1982 annual energy outlook: with projections to 1990 (1982-1990), 8:33146 (R:US)
Nigeria
Nigeria - energy situation 1981, 8:33839 (R:DE:In German)
Prices
Natural gas monthly, 8:33161 (R:US)
Supplemental analysis of natural-gas-consumer regulatory-reform legislation, 8:33163 (R:US)
Production
Natural gas monthly, 8:33161 (R:US)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
Reserves
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)
Stockpiles
Natural gas monthly, 8:33161 (R:US)
Supply and Demand
Rationale for domestic synthetic fuel alternatives (Forecasting: 1980, 1990 and 2000; USA), 8:33098 (RA:US)
NATURAL GAS DEPOSITS
Fractures
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Resource Assessment
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)
Sampling
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)
Stratigraphy
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R:US)
Well Logging
Eastern Gas Shales Project. Corning and Logging Plan, 8:33158 (R:US)
NATURAL GAS INDUSTRY
Data Compilation
Natural gas monthly, 8:33161 (R:US)
Statistical Data
International energy statistical review. Monthly reports, 8:33842 (R:US)
NATURAL GAS POLICY ACT
Supplemental analysis of natural-gas-consumer regulatory-reform legislation, 8:33163 (R:US)
Economic Impact
Natural gas market through 1990, 8:33162 (R:US)
NATURAL GAS WELLS
Blowouts
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Computerized Simulation
Black-oil reservoir simulator is now available, 8:33135 (J:US)
Production
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
NATURAL LIGHTING
See DAYLIGHTING
NEBRASKA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
NEGATIVE IONS
See ANIONS
NEGATONS
See ELECTRONS
NEGATRONS
See ELECTRONS
NEMATODES
Taxonomy
Criconematina (nematoda: tylenchida) from the Aleutian Islands, 8:34437 (J:US)
Three new species of heteroderoidea (nematoda) from the Aleutian Islands, 8:34438 (J:US)
NEOCLASSICAL TRANSPORT THEORY
Resonant ion transport in EBT, 8:34901 (R:US)

NEODYMIUM
Activation Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Scanning Electron Microscopy
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
X-Ray Fluorescence Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
NEODYMIUM 145 TARGET
Neutron Reactions
Measurement of the total Nd-145 neutron cross section, 8:34829 (J:US)
NEODYMIUM 147 TARGET
Neutron Reactions
Resonance parameters of Nd-147 (T/sub 1/2/ = 11ds) isotope neutron levels, 8:34830 (J:US)
NEODYMIUM LASERS
Activation Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
Research Programs
1981 laser program annual report, 8:34943 (R:US)
Scanning Electron Microscopy
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
X-Ray Fluorescence Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
NEON
Ion-Atom Collisions
Recoil ions: production and uses, 8:34713 (RA:US)
Trapping of slow recoil ions: past results and speculations on the future, 8:34714 (RA:US)
Ionization
Trapping of slow recoil ions: past results and speculations on the future, 8:34714 (RA:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
NEON 20 BEAMS
Bragg Curve
Diagnostic studies with high energy radioactive beams, 8:34551 (RA:US)
RBE
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA:US)
Response of mouse marrow colony forming units (CFU-S) to heavy charged particles, 8:34599 (RA:US)
NEON 20 TARGET
Neutron Reactions
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)
NEON 21 TARGET
Neutron Reactions
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)
NEON 22 TARGET
Neutron Reactions
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)
NEON 25
Search for new isotopes at Brookhaven, 8:34809 (J:US)
NEON ISOTOPES
See also NEON 25
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)
NEOPLASMS
See also CARCINOMAS
LEUKEMIA
Bibliographies
Excision repair of DNA damage. I. Enzymology and mechanisms of excision repair. Oncology overview, 8:34602 (R:US)
Diagnosis
Cancer deteCTion and management: nuclear medicine. Cancergram ct02, 8:34555 (R:US)
Heavy-ion radiography, 8:34550 (RA:US)
Negative brain scintigrams in brain tumors, 8:34518 (R:DE:In German)
Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths, 8:34522 (R:DE:In German)
Sonography and computerized tomography in a comparison in renal mass diseases, 8:34528 (R:DE:In German)
Diagnostic Techniques
Expectation values for low-resolution slit-scan flow prescreening: influence of nuclear shape and DNA density, 8:34556 (J:US)
Epidemiology
Carcinogen assessment of coke oven emissions (revised draft), 8:33100 (R:US)
Precursor
Dark cells in human oral leukoplakias, 8:34566 (J:DK)
Radioinduction
Induction of Harderian gland tumors in mice by heavy ion irradiation, 8:34597 (RA:US)
Radiotherapy
Radiotherapy physics, 8:34549 (RA:US)
Treatment of bladder cancer. Oncology overview, 8:34553 (R:US)
Treatment of cancer with heavy charged particles, 8:34548 (RA:US)
Therapy
Cancer deteCTion and management: nuclear medicine. Cancergram ct02, 8:34555 (R:US)
NEPTUNIUM
Adsorption
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
NEPTUNIUM 237
Alpha Spectra
Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass, 8:33238 (J:US)
NEPTUNIUM 237 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J:US)
NERVOUS SYSTEM DISEASES
Neurological aspects of lead intoxication, 8:34626 (R:DE:In German)
NETWORKS (COMPUTER)
See COMPUTER NETWORKS
NEUTRAL BEAM SOURCES
Control Systems
Structured multi-stream command language, 8:34926 (R:US)
NEUTRAL-CURRENT INTERACTIONS
Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R:US)
NEUTRON ACTIVATION ANALYSIS
See ACTIVATION ANALYSIS
NEUTRON REACTIONS
NEUTRON BEAMS
Monochromators
Total neutron cross section of ^{46}Sc at the 2 keV, 8:34817 (J:US)

NEUTRON CAPTURE
See NEUTRON REACTIONS
NEUTRON DENSITY
Computer Codes
EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R:US)
Two-Dimensional Calculations
EXTREME: a new two-dimensional Cartestian-geometry discrete-ordinates method, 8:34852 (R:US)
NEUTRON DETECTION
Activation Detectors
Parasitic absorption and leakage corrections for $MnSO_4$ baths, 8:34383 (J:US)
Bonner Sphere Detectors
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
Dielectric Track Detectors
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
He-3 Counters
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
HgI2 Semiconductor Detectors
Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers, 8:34381 (J:US)
Ionization Chambers
Experience with work with double ionization chambers, 8:34371 (RA:CS:In Czech)
NaI Detectors
Fast neutron detection capabilities of NaI(Tl) scintillator and HgI_2 semiconductor gamma ray spectrometers, 8:34381 (J:US)
Solid Scintillation Detectors
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
NEUTRON DIFFRACTION
Inelastic Scattering
Some optimization considerations in chopper inelastic neutron scattering experiments, 8:34866 (J:NL)
NEUTRON DIFFUSION EQUATION
Computer Calculations
Iterative methods in diffusion calculations, 8:33714 (RA:IL)
Validation of the three-dimensional code TRITON, 8:33723 (RA:IL)
Computer Codes
Validation of the three-dimensional code TRITON, 8:33713 (RA:IL)
Three-Dimensional Calculations
Validation of the three-dimensional code TRITON, 8:33713 (RA:IL)
NEUTRON DOSIMETRY
Directional dependence of the wide energy range Rem response personnel neutron dosimeter, 8:34359 (RA:IL)
Energy dependence of some current personnel neutron dosemeters, 8:34366 (RA:CS:In Czech)
Performance of the wide energy Rem response personnel neutron dosimeter, 8:34361 (RA:IL)
Activation Detectors
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
Albedo-Neutron Dosemeters
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
Dielectric Track Detectors
Comparison of polycarbonate and CR-39 foils as passive detectors in the wide energy range personnel neutron dosimeter, 8:34357 (RA:IL)
Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)
Other possibilities of applying solid state track detectors in neutron dosimetry, 8:34373 (RA:CS:In Czech)
Survey Monitors
Development of a combined real-time neutron dosimeter in the 1 eV to 14 MeV energy region and a survey meter for high neutron dose rates, 8:34358 (RA:IL)
Thermoluminescent Dosemeters
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
NEUTRON ECONOMY
See NEUTRON FLUX
NEUTRON FLUX
Confidence limits and statistical convergence of Monte Carlo point flux estimators with unbounded variance, 8:33711 (RA:IL)
NEUTRON FLUX DENSITY
See NEUTRON FLUX
NEUTRON HEATING
See RADIATION HEATING
NEUTRON LEAKAGE
Leakage importance, 8:33710 (RA:IL)
NEUTRON MATTER
See NUCLEAR MATTER
NEUTRON MONITORS
$^{127}I(n,2n)^{126}I$ reaction as a fast neutron flux monitor, 8:34380 (J:US)
Design
Passive neutron waste monitoring system, 8:34364 (RA:IL)
NEUTRON REACTIONS
Capture
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)
Determination of the capture width of the 27.7 keV s-wave resonance in ^{56}Fe, 8:34814 (J:US)
Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J:US)
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
Measurement of Maxwellian averaged capture cross sections for ^{130}Ba, ^{140}Ce, ^{175}Lu and ^{176}Lu with a special activation technique, 8:34826 (J:US)
Neutron capture resonances in ^{56}Fe and ^{58}Fe in the energy range from 10 to 100 keV, 8:34811 (R:DE)
Neutron capture cross section measurements of ^{58}Fe, 8:34815 (J:US)
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J:US)
Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV, 8:34820 (J:US)
Status of gamma ray production cross section data, 8:34858 (J:US)
Thermal neutron capture cross section in deuterium, 8:34798 (J:US)
Thermal neutron capture gamma-rays, 8:34789 (R:US)
Capture-to-Fission Ratio
Measurement of U-235 absolute alpha value in the neutron energy range from 0.1 to 30 keV, 8:34837 (J:US)
Charge-Exchange Reactions
Cross section for the $^{56}Fe(n,p)$ reaction for 14.73 MeV neutrons, 8:34818 (J:US)
Compound-Nucleus Reactions
Perturbations of nuclear cross sections associated with changes in molecular vibrational energy, 8:34836 (J:US)
Cross Sections
Gamma-ray production cross sections for MeV neutrons, 8:34827 (J:US)
Simple parameterization for optical reaction cross sections, 8:34850 (J:US)
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei, 8:34796 (J:US)
Elastic Scattering
^{12}C + n polarization measurements and the carbon standard, 8:34805 (J:US)

Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni, 8:34813 (J:US)

Fast Fission

Absolute measurement of the U-235 fission cross section from 0.2 - 1.2 MeV, 8:34843 (J:US)

Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)

Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J:US)

Fission

^{235}U (n,f) cross section measurements and normalization problems, 8:34842 (J:US)

First and second chance fission calculations for actinides and related topics, 8:34838 (J:US)

New fission fragment detectors for cross section and angular distribution measurements at CBNM, 8:34382 (J:US)

Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J:US)

Group Constants

Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J:US)

Inelastic Scattering

Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni, 8:34813 (J:US)

Neutron scattering cross sections from (n,n') and (n,n'γ) methods: a comparison, 8:34812 (J:US)

Status of gamma ray production cross section data, 8:34858 (J:US)

Pickup Reactions

Measurement of the ^{10}B/^{6}Li cross section ratio below 1 keV, 8:34802 (J:US)

Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{103}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{208}Tl with 14.6 MeV neutrons, 8:34816 (J:US)

Quasi-Elastic Scattering

^{127}I(n,2n)^{126}I reaction as a fast neutron flux monitor, 8:34380 (J:US)

Resonance

Neutron parameters of curium 242, 244 to 248 isotopes in the resonance region, 8:34841 (J:US)

Resonance parameters of Nd-147 (T/sub 1/2/ = 11ds) isotope neutron levels, 8:34830 (J:US)

Resonance Scattering

Neutron resonance parameters of ^{79}Br and ^{81}Br up to 15 keV, 8:34820 (J:US)

Total Cross Sections

Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)

Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV, 8:34803 (J:US)

Measurement of the total Nd-145 neutron cross section, 8:34829 (J:US)

Total cross section measurements of ^{6}Li, ^{7}Li, and C from 3 to 40 MeV, 8:34801 (J:US)

Total neutron cross section of ^{45}Sc at the 2 keV, 8:34817 (J:US)

NEUTRON SOURCE FACILITIES

Efficient neutron production using low energy electron beams, 8:34350 (J:US)

Modifications

Performance improvements of the Geel Linac neutron source, 8:34351 (J:US)

NEUTRON SOURCES

Excludes reactors even when used as neutron sources.

Accelerator Facilities

Efficient neutron production using low energy electron beams, 8:34350 (J:US)

Beam Monitoring

Comparison of dosimetric methods used for neutron beams in the GDR (Na-2 generator) and in the CSSR (U-120 cyclotron), 8:34372 (RA:CS:In Czech)

Design

Development and investigation of small-sized unsoldered accelerating tubes for a neutron laser generator, 8:34310 (RA:SU:In Russian)

NEUTRON SPECTROMETERS

Passive spectrometer for fast neutrons in the energy range 0.5-14 MeV, 8:34362 (RA:IL)

Liquid Scintillation Detectors

Possibility of p,chemical bond discrimination in a NE213 liquid scintillator, 8:34356 (RA:IL)

NEUTRON STARS

Cyclotron Radiation

Role of cyclotron resonance processes in the spectra of accreting neutron stars, 8:34683 (R:DE)

NEUTRON TRANSPORT

Nuclear constants, 8:34853 (R:SU)

Photon Emission

Status of gamma ray production cross section data, 8:34858 (J:US)

NEUTRON TRANSPORT THEORY

Dancoff Correction

Approximate method for the calculation of transmission probabilities through hollow cylinders, 8:33712 (RA:IL)

Discrete Ordinate Method

Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations, 8:34854 (R:US)

NEUTRON-GAMMA LOGGING

Operation

Neutron induced radioactivity for mineral exploration, 8:34390 (J:US)

Reviews

Neutron induced radioactivity for mineral exploration, 8:34390 (J:US)

NEUTRONS

See also FAST NEUTRONS

Transmission

Measurements and analyses of neutron transport through iron, 8:34859 (J:US)

NEVADA

Basalt

Empirically determined uncertainty in potassium-argon ages for Plio-Pleistocene basalts from Crater Flat, Nye County, Nevada, 8:34669 (R:US)

Gravity Surveys

Principal facts for a gravity survey of the Gerlach Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33562 (R:US)

Principal facts for a gravity survey of the Double Hot Springs Known Geothermal Resource Area, Humboldt County, Nevada, 8:33561 (R:US)

Principal facts for a gravity survey of the Fly Ranch Extension Known Geothermal Resource Area, Pershing County, Nevada, 8:33563 (R:US)

Low-Level Radioactive Wastes

1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)

Radioactive Waste Management

Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

NEW HAMPSHIRE

Low-Level Radioactive Wastes

1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)

Radioactive Waste Management

Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

NEW JERSEY

Low-Level Radioactive Wastes

1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)

Radioactive Waste Management

Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

NEW MEXICO
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Pollution Regulations
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
NEW YORK
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Uranium Deposits
Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R:US)
NEWBORNS
See INFANTS
NICKEL
Biological Effects
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
Catalytic Effects
Catalytic steam reforming of hydrocarbon for production of synthesis gas, 8:33269 (J:IN)
Further developments in the nickel/uranin/α-alumina catalyst system, 8:33141 (J:GB)
Corrosion
Model for the growth of a two-phase corrosion scale, 8:33970 (R:US)
Electron Collisions
Scattering of polarized low-energy electrons by ferromagnetic metals, 8:34721 (RA:BR)
Neutron Reactions
Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J:US)
Measurements of the total neutron cross-sections of Be, Ni and Cu at room and liquid nitrogen temperatures in the energy range from 2.2 eV to 2.2 meV, 8:34803 (J:US)
Oxygen 16 Reactions
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
NICKEL 58 TARGET
Neutron Reactions
Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni, 8:34813 (J:US)
NICKEL 60
Giant Resonance
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
NICKEL 60 TARGET
Neutron Reactions
Elastic and inelastic scattering of 24 MeV neutrons from even isotopes of Ni, 8:34813 (J:US)
NICKEL ALLOYS
See also HASTELLOYS
INCOLOY ALLOYS
NICKEL BASE ALLOYS
Annealing
Annealing studies of amorphous alloys, 8:34247 (R:US)
Corrosion
Use of laser Raman spectroscopy to study hot corrosion of Ni-Cr alloys, 8:33971 (R:US)
Electronic Structure
Positron annihilation process in Ni/sub c/Cu/sub 1-c/ alloys, 8:33956 (R:US)
Sorptive Properties
Project "usage of hydrogen for purposes of energy technology", 8:33263 (R:AT:In German)
Wear
Low-speed sliding damage in TiB_2-Ni composites, 8:34009 (R:US)
NICKEL BASE ALLOYS
See also RENE 41
Corrosion
Corrosion and deposition in coal-derived liquid fueled combustion turbines: turbine simulator tests, 8:33979 (BA:US)
Morphology of corrosion of advanced heat exchanger materials in simulated FBC deposits, 8:33091 (BA:US)
Thermal stability of Cr_2O_3 on nickel-, iron-, and cobalt-based alloys in low oxygen and high sulfur activity environment at high temperature, 8:33005 (BA:US)
NICKEL CHLORIDES
Hydrolysis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Osmosis
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
Thermodynamic Activity
Isopiestic studies of aqueous solutions at elevated temperatures. IV. $NiCl_2$ and $CoCl_2$, 8:34142 (J:GB)
NICKEL COMPLEXES
Chemical Reaction Yield
Evidence for the Br_3^- reaction with Ni(III) macrocyclic complexes: Br_3^- as a possible reducing agent, 8:34197 (J:CH)
Radiolysis
Evidence for the Br_3^- reaction with Ni(III) macrocyclic complexes: Br_3^- as a possible reducing agent, 8:34197 (J:CH)
Structural Chemical Analysis
Biological paramagnetic center: octahedrally coordinated nickel(III) in the methanogenic bacteria, 8:34097 (J:US)
NICKEL OXIDES
Surfaces
Surface cation ratios of binary oxide solid solutions, 8:34008 (J:NL)
NICKEL SULFIDES
Catalytic Effects
Disposable catalyst for coal liquefaction, 8:33008 (J:US)
NIMONIC PE16
Physical Radiation Effects
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R:US)
NIOBIUM
Neutron Reactions
Gamma-ray production cross sections for fast neutron interactions with Al, Ni, Cu, and Nb, 8:34810 (J:US)
NIOBIUM 95
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
NIOBIUM ALLOYS
See also INCONEL 600
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Annealing
Annealing studies of amorphous alloys, 8:34247 (R:US)
Corrosion
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Creep
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)

Electron Beam Welding
Computer programs for calculating thermal distribution on uranium-6 weight percent niobium alloy during electron-beam welding, 8:33974 (R:US)
Hydridation
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)
Physical Radiation Effects
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Texture
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)

NITRATES
See also MANGANESE NITRATES
URANIUM NITRATES
Scavenging
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J:NL)

NITRIC ACID
Binding Energy
Studies of the formation and structure of homomolecular and heteromolecular clusters, 8:34127 (J:NL)
Solvation
Studies of gas-phase clusters: the solvation of HNO_3 in microscopic aqueous clusters, 8:34120 (J:NL)

NITRIC ACID ESTERS
Decomposition
Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J:NL)
Quantitative Chemical Analysis
Determination of methyl nitrite in automobile exhaust gases, 8:33276 (R:SE:In Swedish)

NITRIC OXIDE
NO.
Chemical Reactions
Velocity-selected molecular beam study of rotational excitation in the reaction C + NO → CN + O, 8:34122 (J:NL)

NITROGEN
Breakdown
Formative time lag in SF_6 and N_2, 8:34030 (RA:US)
Corona Discharges
Corona stabilization in SF_6/N_2 mixtures under impulse conditions, 8:34734 (RA:US)
Crystal Structure
Structure of N_2 at 49 kbar and 299 K, 8:34141 (J:DK)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
Mixtures
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Oscillator Strengths
Rules for S(-2k) dipole sums, 8:34733 (J:DE)
Raman Spectra
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R:US)
Thermal Conductivity
Thermal conductivity of mixtures of hydrogen with nitrogen, 8:34103 (J:DE)

NITROGEN 15 REACTIONS
Transfer Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)

NITROGEN 15 TARGET
Proton Reactions
Proton capture to excited states of ^{16}O; Ml, El and Gamow-Teller transitions and shell-model calculations, 8:34799 (R:US)

NITROGEN ISOTOPES
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)

NITROGEN NITRIDES
See NITROGEN

NITROGEN OXIDES
See also NITRIC OXIDE
NITROUS OXIDE
Air Pollution Abatement
Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R:DE:In German)
Air Pollution Control
Current status of dry SO_x control systems, 8:33044 (RA:US)
Formation and reduction of NO sub (x) and POM in coal firing, 8:33057 (R:SE:In Swedish)
Breakdown
Homogeneous field breakdown strength characteristics of some dielectric gases, 8:34026 (RA:US)
Chemical Radiation Effects
DOE's electron beam irradiation development program, 8:33036 (RA:US)
Reduction
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan, 8:33035 (RA:US)
Removal
DOE's electron beam irradiation development program, 8:33036 (RA:US)
Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R:US)
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan, 8:33035 (RA:US)

NITROMETHANE
Decomposition
Limitations of MNDO and MNDO/CI computations of activation barriers, 8:34155 (J:NL)

NITROSO COMPOUNDS
Genetic Effects
Effect of chemical carcinogens on mammalian cells in culture, 8:34619 (RA:US)

NITROUS OXIDE
N_2O.
Chemical Reactions
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34193 (J:NL)
Scavenging
Laser-induced photoelectrochemistry: coulostatic measurements of photoemission in aqueous and non-aqueous solutions, 8:34192 (J:NL)

NMR
See NUCLEAR MAGNETIC RESONANCE

NMR SPECTRA
Computerized Simulation
Computer studies of multiple-quantum spin dynamics, 8:34881 (R:US)
Fourier Transformation
Computer studies of multiple-quantum spin dynamics, 8:34881 (R:US)

NO. 2 FUEL OIL
See HEATING OILS

NOBLE GASES
See RARE GASES

NONDESTRUCTIVE ANALYSIS
Statistical Data
Prompt nuclear analysis: growth and trends. A scientometric study, 8:34062 (J:CH)

NON-DISPERSIVE ION WAVES
See ION ACOUSTIC WAVES

NONLINEAR PROBLEMS
Iterative Methods
Dynamic acceleration of nonlinear iterations, 8:34959 (R:US)

NONLINEAR SYSTEMS
See NONLINEAR PROBLEMS

NONRADIOACTIVE WASTE DISPOSAL
See WASTE DISPOSAL

NONRADIOACTIVE WASTES
See GASEOUS WASTES
SOLID WASTES
WASTES

NORTH CAROLINA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
NORTH DAKOTA
Coal Reserves
Evolution of the UND-government-industry partnership in low-rank coal research (63 references), 8:32941 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
NORTH SEA
Offshore Drilling
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Oil Spills
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Oil Wells
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Some constraints on the use of bacteria in enhanced oil recovery, 8:33125 (RA:US)
NORTHERN IRELAND
See UNITED KINGDOM
NOVA FACILITY
Research Programs
1981 laser program annual report, 8:34943 (R:US)
NOZZLES
Cracks
Underclad cracking in PWR reactor vessels, 8:33681 (TG:GB)
NUCLEAR CONTROVERSY
See HUMAN POPULATIONS
NUCLEAR DATA COLLECTIONS
Evaluated nuclear structure data file. A manual for preparation of data sets, 8:34790 (R:US)
NUCLEAR DEFORMATION
For deformation of not permanently deformed nuclei.
Liquid Drop Model
Classifying the singularity in the deformation shape of the liquid-drop model, 8:34847 (J:IT)
NUCLEAR ENERGY
Cost
Economic consequences of the delay in the nuclear energy developing programme in Baden-Wuerttemberg considering topical cost-analyses on the power generation sector, 8:33813 (R:DE:In German)
Energy Policy
Joint comment: Future nuclear energy policy - Interim report 1980 of the Enquete-Commission, 8:33847 (R:DE:In German)
Environmental Impacts
Nuclear energy - the Brazilian rules for the environment protection, 8:34421 (B:BR:In Portuguese)
Legislation
Evolution and present situation of nuclear energy legislation in Brazil, 8:33820 (B:BR:In Portuguese)
Radiation Hazards
Development trends of nuclear risk insurance in Brazil, 8:33778 (B:BR:In Portuguese)
NUCLEAR FACILITIES
See also FUEL FABRICATION PLANTS
FUEL REPROCESSING PLANTS
NUCLEAR POWER PLANTS
RADIOACTIVE WASTE FACILITIES
Emergency Plans
NRC Incident-Response Plan, 8:33751 (R:US)
Geology
Geologic and hydrologic research at the Western New York Nuclear Service Center, West Valley, New York. Annual report, August 1981-July 1982, 8:34668 (R:US)
Hydrology
Geologic and hydrologic research at the Western New York Nuclear Service Center, West Valley, New York. Annual report, August 1981-July 1982, 8:34668 (R:US)
Legal Aspects
NRC Regulatory Agenda. Quarterly report, January-February 1983. Vol. 2, No. 1, 8:33697 (R:US)
Physical Protection
Physical protection of nuclear-facilities and materials, 8:33257 (B:BR:In Portuguese)
Pollution Control
1982 UCC-ND/GAT environmental protection seminar: proceedings, 8:34449 (R:US)
NUCLEAR FUEL ELEMENTS
See FUEL ELEMENTS
NUCLEAR FUELS
Production
Production of nuclear fuel in Israel. Feasibility and justification, 8:33816 (RA:IL)
NUCLEAR MAGNETIC RESONANCE
Correlation Functions
NMR studies of fast-ion conductors, 8:34863 (R:US)
Research Programs
Nuclear magnetic resonance programs at Lawrence Berkeley Laboratory, 8:34590 (RA:US)
Reviews
Time-domain multiple-quantum NMR, 8:34795 (R:US)
NUCLEAR MATERIALS DIVERSION
Atomic Energy Control
Problems of non-proliferation and nuclear safeguards, 8:34470 (R:DE:In German)
NUCLEAR MATERIALS MANAGEMENT
Sampling
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:33256 (R:US)
NUCLEAR MATTER
Phase Transformations
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
Quarks
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
NUCLEAR MEDICINE
NELMA project. I. Objectives of the methodical aspects (Nuclear Energy Laboratory of Medical and Agricultural Sciences), 8:34280 (J:US)
Bibliographies
Cancer deteCTion and management: nuclear medicine. Cancergram ct02, 8:34555 (R:US)
NUCLEAR MODELS
See also COLLECTIVE MODEL
LIQUID DROP MODEL
PARTICLE-HOLE MODEL
Unique parity states in ^{109}Pd as a test of particle-rotor and IBFA models, 8:34825 (BA:US)
Meetings
Gross properties of nuclei and nuclear excitations. Proceedings, 8:34761 (R:DE)
NUCLEAR PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text books, etc.
General and nuclear physics, 8:34793 (R:UA)
Nuclear constants, 8:34853 (R:SU)
Problems of nuclear physics and cosmic rays. No. 15. Republican interdepartmental scientific collection, 8:34682 (R:SU:RU)
Research Programs
Final report on R + D works in 1981, 8:34792 (R:DE:In German)
Reviews
Final report on R + D works in 1981, 8:34792 (R:DE:In German)

NUCLEAR POWER
Comparative Evaluations
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
Cost
Costs comparison of electric energy in Brazil, 8:33625 (RA:BR:In Portuguese)
Life-Cycle Cost
Life cycle cost. Reliability optimization of a complex system, 8:33705 (RA:IL)
NUCLEAR POWER PLANTS
See also UNDERGROUND NUCLEAR STATIONS
Containment Shells
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
Cost
Cost evolution of electric energy in Brazil, 8:33626 (RA:BR:In Portuguese)
Economics
Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants, 8:33624 (R:US)
Comparing the effects of three nuclear power plants on future electricity prices, 8:33865 (R:US)
Electronic Equipment
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R:US)
Legal Aspects
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Performance Testing
Coming in close with Minac, 8:33731 (J:US)
Personnel
Allowable shipment frequencies for the transport of toxic gases near nuclear power plants, 8:33757 (R:US)
Radiation Accidents
Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2, 8:33762 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3, 8:33763 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): user's guide, 8:33761 (R:US)
Radioactive Waste Disposal
Radioactive waste disposal options for the operation of nuclear power stations, 8:33216 (RA:IL)
Rate Structure
Analysis of the electric-utility industry in the US: an assessment of the economic and rate impacts of building additional powerplants, 8:33624 (R:US)
Reactor Accidents
Nuclear reactor safety in the USA, 8:33749 (R:US)
Reactor Components
In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R:US)
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R:US)
Reactor Maintenance
In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Reactor Safety
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Nuclear reactor safety in the USA, 8:33749 (R:US)
Risk Assessment
Nuclear reactor safety in the USA, 8:33749 (R:US)
Safety
Allowable shipment frequencies for the transport of toxic gases near nuclear power plants, 8:33757 (R:US)
Seismic Effects
Subsystem seismic response uncertainty from sources in the seismic methodology chain, 8:33773 (BA:US)
NUCLEAR POWER STATIONS
See NUCLEAR POWER PLANTS
NUCLEAR REACTION ANALYSIS
Statistical Data
Prompt nuclear analysis: growth and trends. A scientometric study, 8:34062 (J:CH)
NUCLEAR REACTIONS
See also COMPOUND-NUCLEUS REACTIONS
FISSION
HADRON REACTIONS
PHOTONUCLEAR REACTIONS
PRECOMPOUND-NUCLEUS EMISSION
Cross Sections
Nuclear cross sections for technology, 8:34794 (B:US)
Excitation Functions
Semiempirical calculation of excitation functions, 8:34828 (J:US)
NUCLEAR SAFETY
See RADIATION PROTECTION
NUCLEAR SPIN RESONANCE
See NUCLEAR MAGNETIC RESONANCE
NUCLEAR STRUCTURE
Nuclear Data Collections
Evaluated nuclear structure data file. A manual for preparation of data sets, 8:34790 (R:US)
NUCLEAR WASTES
See RADIOACTIVE WASTES
NUCLEASE (RIBONUCLEASE)
See RNA-ASE
NUCLEATION
Summary abstract: studies of small clusters. Relationship to understanding nucleation and surfaces, 8:34121 (J:US)
NUCLEIC ACIDS
See also DNA
RNA
Radiolysis
Study of the molecular basis for radiation mutagenesis. Final progress report, 8:34574 (R:US)
NUCLEOSOMES
Chemical Composition
Nucleosomes: composition and substructure, 8:34493 (BA:US)
Molecular Structure
Nucleosomes: composition and substructure, 8:34493 (BA:US)
Physical Properties
Nucleosomes: composition and substructure, 8:34493 (BA:US)
Reviews
Nucleosomes: composition and substructure, 8:34493 (BA:US)

O

OAK RIDGE GASEOUS DIFFUSION PLANT
See ORGDP
OBESITY
See METABOLIC DISEASES
OBRIGHEIM REACTOR
Plutonium Recycle
Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant, 8:33666 (R:DE:In German)
Qualification of the fuel technology for the plutonium recycling in light water reactors, 8:33667 (R:DE:In German)
OCEAN THERMAL ENERGY CONVERSION
Economics
Sensitivity of OTEC product prices to financial parameters, 8:33291 (RA:US)
Interest Groups
Florida Ocean Thermal Energy Consortium, 8:33305 (RA:US)
Laws
Ocean Thermal Energy Conversion: the evolution of an industry through regulation, 8:33298 (RA:US)
Legislation
OTEC legislative needs, 8:33303 (RA:US)

Meetings
Proceedings of the 8th ocean energy conference, 8:33366 (R:US)
Regulations
Regulation of OTEC energy and energy product equivalents, 8:33301 (RA:US)
OCEAN THERMAL POWER PLANTS
OTEC produced ammonia: an alternative fuel, 8:33375 (RA:US)
Aquaculture
OTEC and island industry synergy: the St. Croix case, 8:33373 (RA:US)
OTEC energy transference via biomass: the pros and cons, 8:33379 (RA:US)
Bubbles
Bubble entrainment on OTEC-1: implications for future OTEC designs, 8:33401 (RA:US)
Computerized Simulation
Ocean Thermal Energy Conversion plant dynamic simulation models, 8:33396 (RA:US)
Construction
Availability of offshore industry technology for construction of ocean energy facilities, 8:33386 (RA:US)
Building ocean thermal energy conversion facilities and plantships: requirements for unique construction facilities, 8:33387 (RA:US)
Cost
Application of OTEC-1 performance and fabrication cost data to estimation of OTEC power system cost, 8:33381 (RA:US)
Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC) central station, 8:33288 (RA:US)
Cost Benefit Analysis
OTEC: estimating total systems benefits and costs, 8:33284 (RA:US)
Decision Making
OTEC: a business strategy perspective, 8:33285 (RA:US)
Desalination Plants
OTEC and island industry synergy: the St. Croix case, 8:33373 (RA:US)
Economic Analysis
Advanced alkaline electrolysis systems for OTEC, 8:33378 (RA:US)
Review of OTEC energy cost calculations, 8:33283 (RA:US)
Economic Impact
Domestic social and economic impacts of OTEC commercial development, 8:33286 (RA:US)
Economics
Effect of PURPA on OTEC economics, 8:33302 (RA:US)
Estimate of OTEC costs and electric market potential, 8:33290 (RA:US)
Introductory study of the economic factors favorable to an OTEC electric power generation station on Saipan, Commonwealth of the Northern Mariana Islands, 8:33293 (RA:US)
Electric Cables
Commercial aspects of OTEC power cable manufacture, 8:33383 (RA:US)
Constructability of submarine bottom cables for OTEC power transmission, 8:33384 (RA:US)
Developmental design status of riser cable systems for OTEC pilot plants, 8:33371 (RA:US)
Methods of predicting loading and bending induced in an OTEC riser cable, 8:33367 (RA:US)
OTEC subsea electrical power cable protection systems and technology, 8:33372 (RA:US)
Testing of OTEC riser cable components and models, 8:33368 (RA:US)
Testing of full scale prototype OTEC riser cables, 8:33370 (RA:US)
Electrolytic Cells
Advanced alkaline electrolysis systems for OTEC, 8:33378 (RA:US)
Advanced water electrolysis technology for efficient utilization of ocean thermal energy, 8:33377 (RA:US)
Feasibility Studies
OTEC aluminum intergration studies, 8:33374 (RA:US)
Financial Incentives
Financing of OTEC projects, 8:33289 (RA:US)
Financing
Cost targets for OTEC: the impact of innovative financing, 8:33287 (RA:US)
Financing ocean thermal energy conversion projects with existing US maritime aids, 8:33292 (RA:US)
Forecasting
OTEC utility users council 2000 A.D. market, 8:33394 (RA:US)
Heat Exchangers
Constructability of extended surface heat exchangers for OTEC, 8:33380 (RA:US)
OTEC-1 heat exchanger test results, 8:33399 (RA:US)
Hydrometallurgy
OTEC power applications to deep ocean mining, 8:33376 (RA:US)
Licensing
Impact of the OTEC Act of 1980 on OTEC operations outside US waters, 8:33307 (RA:US)
Marketing Research
Market potential for OTEC in developing nations, 8:33294 (RA:US)
Performance Testing
Test of OTEC plant in Imari Bay, 8:33392 (RA:US)
Permits
OTEC and the EPA permitting process, 8:33299 (RA:US)
Personnel
OTEC personnel consideration, 8:33395 (RA:US)
Pipes
Analysis of the up-ending problem of OTEC-1 cold water pipe, 8:33400 (RA:US)
Ocean thermal energy conversion cold water pipe workshop. Volume I of III, 8:33403 (R:US)
Utilization of the oceans for sub-scale testing of OTEC components, 8:33391 (RA:US)
Planning
Approach to risk assessment in OTEC development planning, 8:33393 (RA:US)
Electric-utility-system planning studies for OTEC power integration by Puerto Rico Electric Power Authority. Final report, 8:33402 (R:US)
Positioning
Development of large thrusters for dynamic positioning of OTEC systems, 8:33382 (RA:US)
Public Policy
State of Hawaii public sector OTEC program, 8:33304 (RA:US)
Pyrometallurgy
OTEC power applications to deep ocean mining, 8:33376 (RA:US)
Regulations
Regulatory authorities of the US Army Corps of Engineers over OTEC projects, 8:33300 (RA:US)
United States Coast Guard and OTEC development, 8:33397 (RA:US)
Research Programs
Puerto Rico and the Puerto Rico Electric Power Authority OTEC commitment, 8:33306 (RA:US)
Risk Assessment
Approach to risk assessment in OTEC development planning, 8:33393 (RA:US)
Site Selection
Electric-utility-system planning studies for OTEC power integration by Puerto Rico Electric Power Authority. Final report, 8:33402 (R:US)
Puerto Rico and the Puerto Rico Electric Power Authority OTEC commitment, 8:33306 (RA:US)
Social Impact
Domestic social and economic impacts of OTEC commercial development, 8:33286 (RA:US)
Socio-Economic Factors
OTEC and island industry synergy: the St. Croix case, 8:33373 (RA:US)

Test Facilities
Capabilities and potential of the SS Ocean Energy Converter as an ocean test facility, 8:33389 (RA:US)
Capabilities and potential of the OTEC seacoast test facility, 8:33390 (RA:US)
Overall OTEC-1 status and accomplishments, 8:33398 (RA:US)
Thrusters
Development of large thrusters for dynamic positioning of OTEC systems, 8:33382 (RA:US)
Turbines
Turboexpanders for OTEC power plant (VA 8), 8:33385 (RA:US)
Uses
Mini-OTEC 2 program plan for electrochemical and synthetic fuels demonstration, 8:33388 (RA:US)
OTEC aluminum intergration studies, 8:33374 (RA:US)

OCEANS
See SEAS

ODOCOILEUS
See DEER

OFF-GAS SYSTEMS
Decontamination
Separation of special toxic substances from the air and incinerator of offgas streams, especially of radioactive iodine and polycyclic carbon hydrogens, 8:34462 (R:AT:In German)
Safety
Hazards analysis of TNX Large Melter-Off-Gas System, 8:33213 (R:US)

OFFICE BUILDINGS
Computerized Simulation
Use of cost-effectiveness and comfort bases for selecting from among alternative envelope design strategies for a high-rise office building, 8:33909 (J:US)
Daylighting
Commercial office daylighting demonstration, 8:33921 (J:US)
Donohue Corporate Office Headquarters: a cost effective energy conscious design, 8:33517 (J:US)
Roof apertures in office buildings, 8:33894 (R:US)
Substitution of daylighting for electric lighting in a large office building, 8:33922 (J:US)
Earth Berms
Donohue Corporate Office Headquarters: a cost effective energy conscious design, 8:33517 (J:US)
Economics
Use of cost-effectiveness and comfort bases for selecting from among alternative envelope design strategies for a high-rise office building, 8:33909 (J:US)
Energy Analysis
Energy conservation and solar retrofit analysis of a large office building, 8:33913 (J:US)
Energy Conservation
Energy conservation and solar retrofit analysis of a large office building, 8:33913 (J:US)
Reduction of the energy consumption of an existing building by replacement of the building facade, demonstrated at the office building of EWAG, Nuernberg, 8:33889 (R:DE:In German)
Indoor Air Pollution
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)
Passive Solar Heating Systems
Donohue Corporate Office Headquarters: a cost effective energy conscious design, 8:33517 (J:US)
Planning
Energy concepts for office buildings, 8:33898 (R:CH)
Skylights
Roof apertures in office buildings, 8:33894 (R:US)
Solar Water Heaters
Energy conservation and solar retrofit analysis of a large office building, 8:33913 (J:US)
Thermal Comfort
Use of cost-effectiveness and comfort bases for selecting from among alternative envelope design strategies for a high-rise office building, 8:33909 (J:US)

OFFSHORE DRILLING
Blowouts
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Legal Aspects
Risk analysis - safety program. Summary report, 8:33142 (R:NO)
Oil Spills
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Risk Assessment
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Safety
Risk analysis - safety program. Summary report, 8:33142 (R:NO)

OFFSHORE OPERATIONS
Safety
Risk analysis - safety program. Summary report, 8:33142 (R:NO)

OFFSHORE PLATFORMS
Includes gravity or fixed, floating, and towed platforms.
Explosions
Risk analysis, gas and oil leakages, 8:33143 (R:NO)
Fire Fighting
Fire extinguishing offshore. Subreport 2. Fire fighting agents and equipment- their capabilities in hydrocarbon fires, 8:33145 (R:NO)
Fire Hazards
Fire extinguishing offshore. Subreport 1. Characterization of fire and explosion events on production platforms, 8:33144 (R:NO)
Fires
Risk analysis, gas and oil leakages, 8:33143 (R:NO)
Mathematical Models
Ocean thermal energy conversion cold water pipe workshop. Volume I of III, 8:33403 (R:US)
Mechanical Vibrations
Finite element analysis for evaluation of eigenfrequency and natural shape alterations by welded joint cracks for pipes of offshore-platforms, 8:34260 (R:DE:In German)
Risk Assessment
Risk analysis, gas and oil leakages, 8:33143 (R:NO)
Stability
Finite element analysis for evaluation of eigenfrequency and natural shape alterations by welded joint cracks for pipes of offshore-platforms, 8:34260 (R:DE:In German)

OHIO
Black Shales
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Natural Gas Deposits
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

OIL FIELDS
Abandoned Wells
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Power Generation
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)

Steam Generation
Assessment of the costs of producing cogenerated electricity in the enhanced oil recovery industry, 8:33147 (R:US)
OIL RESIDUES
See PETROLEUM RESIDUES
OIL SAND DEPOSITS
Review of reported tar-sand occurrences and recent projects in Wyoming (78 occurrences), 8:33168 (R:US)
OIL SANDS
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
OIL SHALE WASTE WATER
See OIL SHALES
WASTE WATER
OIL SHALES
See also BLACK SHALES
In-Situ Retorting
Metal corrosion in oil shale retorts, 8:33169 (BA:US)
Research Programs
Quantitation of oil shale wastewater quality. A manual of analytical methods (Lead Abstract), 8:33175 (R:US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Retorting
Metal corrosion in oil shale retorts, 8:33169 (BA:US)
OIL SPILL FINGERPRINTING
See OIL SPILLS
OIL SPILLS
Biological Effects
Ecological study of the 'Amoco Cadiz' oil spill, 8:33155 (R:US)
Environmental Effects
Advanced fossil energy program, 8:34452 (RA:US)
Ecological study of the 'Amoco Cadiz' oil spill, 8:33155 (R:US)
Evaporation
Thin-film evaporation of coal liquids, 8:33067 (R:US)
Hydrodynamics
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)
OIL WELLS
Blowouts
Hydrodynamics of underwater blowouts, 8:33154 (R:NO)
Risk picture: Risk of oil and gas well blowout on the Norwegian Continental Shelf, 8:33153 (R:NO)
Computerized Simulation
Black-oil reservoir simulator is now available, 8:33135 (J:US)
Damage
Possible reservoir damage from microbial enhanced oil recovery, 8:33112 (RA:US)
Microbial EOR
International conference on microbial enhancement of oil recovery, 8:33104 (R:US)
Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry, 8:33107 (RA:US)
Microbial enhancement of oil recovery in Romania, 8:33122 (RA:US)
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Microbially enhanced oil recovery from the Upper Cretaceous Nacatoch formation, Union County, Arkansas, 8:33123 (RA:US)
Petroleum microbiology and the history of its role in enhanced oil recovery, 8:33126 (RA:US)
Pilot microscreen separation of Sclerotium rolfsii biomass and broth (Sclerotium rolfsii), 8:33136 (J:US)
Possible reservoir damage from microbial enhanced oil recovery, 8:33112 (RA:US)
Some constraints on the use of bacteria in enhanced oil recovery, 8:33125 (RA:US)
Survey of research on the application of microbial techniques to the petroleum production in China, 8:33121 (RA:US)
Plugging
Possible reservoir damage from microbial enhanced oil recovery, 8:33112 (RA:US)
Steam Injection
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
OKLAHOMA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
OLEFINS
See ALKENES
ONCOGENIC TRANSFORMATIONS
Bioassay
In vitro transformation of human mammary epithelial cells, 8:34621 (RA:US)
Radioinduction
Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells, 8:34593 (RA:US)
Cellular and molecular radiobiology of heavy-ion beams, 8:34594 (RA:US)
ONCOGENIC VIRUSES
Biological Effects
Anomolous inability of Rous sarcoma virus to cause tumors in avian embryos, 8:34560 (RA:US)
ON-LINE COMPUTERS
See COMPUTERS
OPEN-CYCLE MHD GENERATORS
Hydrodynamics
Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel, 8:33879 (R:DE:In German)
Performance
Dependence of MHD energy-conversion with combustion gases on the turbulent boundary layer in the channel, 8:33879 (R:DE:In German)
OREGON
See also MT HOOD
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
ORGANIC ACIDS
Excluding NUCLEIC ACIDS and NUCLEOTIDES.
See also CARBOXYLIC ACIDS
Adsorption
Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R:DE:In German)
ORGANIC CHLORINE COMPOUNDS
See also CHLORINATED ALIPHATIC HYDROCARBONS
CHLORINATED AROMATIC HYDROCARBONS
Photolysis
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)
ORGANIC COMPOUNDS
See also AMINES
AROMATICS
ESTERS
HYDROCARBONS
HYDROXY COMPOUNDS
KETONES
LIPIDS
NUCLEIC ACIDS
ORGANIC ACIDS
ORGANIC NITROGEN COMPOUNDS
ORGANIC OXYGEN COMPOUNDS
ORGANIC POLYMERS
ORGANOMETALLIC COMPOUNDS
PROTEINS

Radiolysis
Fast reaction studies of organic ions in solution, 8:34203 (BA:NL)

ORGANIC FLUORINE COMPOUNDS
See also FLUORINATED ALIPHATIC HYDROCARBONS
FLUOROURACILS
Photolysis
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)

ORGANIC MATTER
Only for unspecified materials containing chain and ring compounds of carbon; if specific organic compounds are studied, use descriptors for the compounds.
See also PEAT
Absorptivity
Asymmetrical relationships between absorbance, fluorescence, and dissolved organic carbon, 8:34448 (J:US)
Fluorescence
Asymmetrical relationships between absorbance, fluorescence, and dissolved organic carbon, 8:34448 (J:US)

ORGANIC NITROGEN COMPOUNDS
Excluding PROTEINS, AMINES, ALKALOIDS, AMINO ACIDS, NUCLEIC ACIDS, and NUCLEOTIDES.
See also AMIDES
IMIDES
IMINES
NITROSO COMPOUNDS
OXIMES
PHENANTHROLINES
Biological Effects
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)

ORGANIC OXYGEN COMPOUNDS
Excluding HYDROXY COMPOUNDS, CARBONIC ACID DERIVATIVES, LIPIDS, STEROIDS, CARBOHYDRATES, ORGANIC ACIDS, ALDEHYDES, KETONES and ESTERS.
See also EPOXIDES
RHODAMINES
Quantitative Chemical Analysis
Development of sampling and analytical method for styrene oxide, 8:34068 (J:US)
Shear Properties
Shear mechanical properties of free-standard liquid crystal films, 8:34154 (BA:US)

ORGANIC POLYMERS
See also COPOLYMERS
POLYAMIDES
Electric Conductivity
Electrical conductivity of doped polyacrylonitrile (PAN) (Halogen doped polyacrylonitrile), 8:34013 (R:US)
Sorptive Properties
Volume dependence of the elastic equation of state. 2. Solution-cured poly(dimethylsiloxane), 8:34156 (J:US)

ORGANIC WASTES
See also AGRICULTURAL WASTES
Waste Processing
Environmental impacts of proposed toxic substances incinerator, 8:34254 (RA:US)

ORGANOMETALLIC COMPOUNDS
For compounds of metals and semimetals with organic compounds, but only when the metal or semimetal is directly bound to carbon.
Chemical Preparation
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)
Crystal Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)
Decomposition
Concurrent and competitive homolysis and elimination reactions of (α-phenylethyl)aquocobaloxime, 8:34115 (J:US)
Molecular Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)

ORGDP
Water Treatment
Prediction of long-term impact of PGDP chromate sludge lagoon discharge, 8:34450 (RA:US)

ORYZA
See RICE

OSCILLATIONS (PLASMA)
See PLASMA WAVES

OTEC
See OCEAN THERMAL ENERGY CONVERSION

OVERBURDEN
Chemical Analysis
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
Lithology
Model for roof spalling and its application to predicting cavity shape for the Hanna III UCG field test, 8:32980 (RA:US)
Mechanical Properties
Site characterization: geophysical R and D needs, 8:32986 (RA:US)
Status of technology associated with cavity and subsidence response prediction associated with underground coal conversion, 8:32976 (RA:US)

OVERHEAD POWER TRANSMISSION
Power Transmission Lines
Parameters influencing the switching surge strength of transmission line air insulation, 8:33630 (RA:US)

OXIMES
Decomposition
Concurrent and competitive homolysis and elimination reactions of (α-phenylethyl)aquocobaloxime, 8:34115 (J:US)

OXIRANS
See EPOXIDES

OXOCARBOXYLIC ACIDS
See KETO ACIDS

OXYGEN
Absorption Spectroscopy
Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R:US)
Adsorption
Chemical properties of anion vacancies on zinc oxide, 8:34006 (J:NL)
Chemical Reaction Kinetics
Photo-oxidation of 1,3-dichlorotetrafluoroacetone: mechanism of the reaction of CF_2Cl with oxygen, 8:34182 (J:CH)
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Chemisorption
Monte Carlo study of diffusion in a model of an ordered absorbate, 8:34136 (J:GB)
Crystal Structure
Structure of O_2 at 5.5 GPa and 299 K, 8:34051 (J:DK)
Ion Scattering Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
Oscillator Strengths
Rules for S(-2k) dipole sums, 8:34733 (J:DE)
Raman Spectra
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R:US)
Shock Waves
Resonance absorption measurements of atom concentrations in reacting gas mixtures. 9. Measurements of O atoms in oxidation of H_2 and D_2, 8:34087 (R:US)

OXYGEN 16
Energy-Level Transitions
Proton capture to excited states of ^{16}O; Ml, El and Gamow-Teller transitions and shell-model calculations, 8:34799 (R:US)

OXYGEN 16 REACTIONS
Heavy Ion Reactions
Onset of incomplete momentum transfer in fusion-like processes, 8:34808 (R:US)

OXYGEN 17 TARGET
Photonuclear Reactions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
OXYGEN 18 REACTIONS
Transfer Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
OXYGEN 18 TARGET
Beryllium 9 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
Nitrogen 15 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
Oxygen 18 Reactions
Search for new isotopes at Brookhaven, 8:34809 (J:US)
OXYGEN EFFECT (RADIOBIOLOGY)
See OXYGEN
OXYGEN HYDRIDES
See WATER
OXYGEN ISOTOPES
See also OXYGEN 16
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)
OXYGEN LOGS
See NEUTRON-GAMMA LOGGING
OXYGEN METERS
Development of a technique for measuring oxygen partial pressures within a fluidized bed, 8:33095 (BA:US)
Design
Automatic analyzers for monitoring water composition and their applications in nuclear power engineering, 8:33679 (RA:CS:In Czech)
OXYIODIDES
Lattice Parameters
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
Spectrophotometry
X-ray-diffraction and absorption-spectrophotometric studies of AmI_3 and AmOI, 8:34205 (R:US)
OXYMETHYLENE
See FORMALDEHYDE
OZONE
Biological Effects
Thyroid hormone studies after ozone exposure, 8:34618 (RA:US)
Production
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)
Toxicity
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)

P

P REACTOR
Electrical Equipment
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactor Fueling
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Instrumentation
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Maintenance
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
PABA
Ionization
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
Ultraviolet Spectra
Photoelectron spectroscopy of carbonyls: benzoic acid and its derivatives, 8:34165 (J:NL)
PACIFIC NORTHWEST LABORATORIES
See BATTELLE PACIFIC NORTHWEST LABORATORIES
PACKAGING
Design
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
Quality Assurance
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
PADUCAH PLANT
Water Treatment
Prediction of long-term impact of PGDP chromate sludge lagoon discharge, 8:34450 (RA:US)
PAH
See POLYCYCLIC AROMATIC HYDROCARBONS
PAIR PRODUCTION
Quantum Chromodynamics
Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R:US)
PAIR SPECTROMETERS
Streamer Spark Chambers
Streamer spectrometer for the study of rare neutron reactions, 8:34377 (RA:SU:In Russian)
PALLADIUM 102 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{113}Sn, $^{106\ 114}Cd$, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
PALLADIUM 109
Energy Levels
Unique parity states in ^{109}Pd as a test of particle-rotor and IBFA models, 8:34825 (BA:US)
PANCREAS
Radiology
Pre-surgical radiologic diagnostics of pancreas diseases, 8:34521 (R:DE:In German)
PAPER CHROMATOGRAPHY
See CHROMATOGRAPHY
PARA-AMINOBENZOIC ACID
See PABA
PARABANIC ACID
See ORGANIC OXYGEN COMPOUNDS
PARABOLIC DISH COLLECTORS
Technology Assessment
Advanced solar thermal technology, 8:33543 (J:US)
PARABOLIC POINT COLLECTORS
See PARABOLIC DISH COLLECTORS
PARAFFINS
See ALKANES
PARAMAGNETIC RESONANCE (NUCLEAR)
See NUCLEAR MAGNETIC RESONANCE
PARTICLE BOOSTERS
First stages of a multistage accelerator.
Performance
Recent developments at BNL, 8:34302 (R:US)
PARTICLE INTERACTIONS
See also HADRON-HADRON INTERACTIONS
NEUTRAL-CURRENT INTERACTIONS
PHOTON-PHOTON INTERACTIONS
Mathematical Models
Correlated neutron-proton emission in relativistic heavy-ion interactions, 8:34751 (RA:US)
Transport Theory
Transport studies of the interaction of high-energy heavy ions with extended matter, 8:34752 (RA:US)
PARTICLE MODELS
See also EXTENDED PARTICLE MODEL
HIGGS MODEL
UNIFIED GAUGE MODELS
Schroedinger Picture
N=2 massive matter multiplet from quantization of extended classical mechanics, 8:34777 (R:XA)

Supersymmetry
N=2 massive matter multiplet from quantization of extended classical mechanics, 8:34777 (R:XA)

PARTICLE TRACKS
Data Analysis
Accuracy of track reconstruction with inhomogeneous magnetic detectors, 8:34851 (R:DE)

PARTICLE-HOLE MODEL
Corrections
Pairing correction for particle-hole state densities, 8:34846 (R:US)
Pairing Energy
Pairing correction for particle-hole state densities, 8:34846 (R:US)

PARTICLES
When appropriate use more specific terms listed under CHARGED PARTICLES, ELEMENTARY PARTICLES, and QUASI PARTICLES.
See also DROPLETS
PARTICULATES
Trajectories
Dynamics of bubbles and entrained particles in the rotating fluidized bed, 8:34239 (J:US)

PARTICULATES
Prior to September 1981, this concept was indexed to PARTICLES and AEROSOLS.
Acoustic Detection
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Chemical Analysis
Analysis of particulates for very light elements by forward scattering of alpha particles, 8:34085 (J:US)
Removal
Simultaneous removal of SO_2 and particulates from flue gas, 8:33054 (RA:US)

PARTITION CHROMATOGRAPHY
See CHROMATOGRAPHY

PARTONS
Fragmentation
Quark fragmentation and the determination of α/sub s/, 8:34756 (R:US)

PASSIVE SOLAR COOLING SYSTEMS
Bench-Scale Experiments
Detached earth cooling with radiant interior building elements, 8:33534 (J:US)
Computer Codes
Predicted and observed performance of a buried earth-air heat exchanger cooling system, 8:33533 (J:US)
Design
Approach to teaching calculation procedures for passive design, 8:33483 (J:US)
Overview of designs from the DOE Passive Commercial Buildings Program, 8:33503 (J:US)
Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J:US)
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Heat Exchangers
Predicted and observed performance of a buried earth-air heat exchanger cooling system, 8:33533 (J:US)
Meetings
6th national passive-solar conference, 8:33413 (B:US)
Performance
Actual cooling performances of underslab systems in Davis, California, 8:33418 (J:US)
Non-instrumented performance evaluation of 335 passive solar homes, 8:33414 (J:US)
Performance Testing
Predicted and observed performance of a buried earth-air heat exchanger cooling system, 8:33533 (J:US)
Radiators
Detached earth cooling with radiant interior building elements, 8:33534 (J:US)
Rock Beds
Actual cooling performances of underslab systems in Davis, California, 8:33418 (J:US)
Soils
Detached earth cooling with radiant interior building elements, 8:33534 (J:US)
Predicted and observed performance of a buried earth-air heat exchanger cooling system, 8:33533 (J:US)

PASSIVE SOLAR HEATING SYSTEMS
See also DIRECT GAIN SYSTEMS
TROMBE WALLS
Auxiliary Heating
Comparison of measured and predicted thermal performance of passive solar residences, 8:33466 (J:US)
Calculation Methods
Revised renewable resource calculation procedures for the RCS program, 8:33410 (R:US)
Comparative Evaluations
Comparative analysis of conservation and passive solar strategies in multi-family residences, 8:33445 (J:US)
Comparison of monitored passive buildings, 8:33425 (J:US)
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)
Conservation and passive solar: a performance comparison in Washington State, 8:33444 (J:US)
Competition
Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J:US)
Computerized Simulation
Performance studies of passive solar applications in the mid-west using blast, a large hourly calculation computer-based simulation program, 8:33449 (J:US)
Validation of CALPAS3 computer simulation program, 8:33465 (J:US)
Construction
Building and marketing passive solar homes, 8:33495 (J:US)
Passive solar construction handbook, 8:33486 (J:US)
Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J:US)
Solar homebuilders program: getting builders to build solar, 8:33317 (J:US)
Cost
Denver Metro Solar House: incremental costs and payback analysis, 8:33297 (J:US)
Demonstration Programs
Not everyone's a scientist - not everyone's a bureaucrat (Financing and monitoring of passive solar houses in North Carolina), 8:33494 (J:US)
Towards a bioclimatic architecture, 8:33507 (J:US)
Design
Approach to teaching calculation procedures for passive design, 8:33483 (J:US)
Architectural/solar design methodology, 8:33511 (J:US)
Integrating passive solar systems with exciting architectural form, 8:33513 (J:US)
Low cost passive solar townhomes, 8:33492 (J:US)
Marketable passive solar housing design for merchant builders, 8:33493 (J:US)
New York State passive solar design and retrofit competition, 8:33527 (J:US)
Overview of designs from the DOE Passive Commercial Buildings Program, 8:33503 (J:US)
Passive solar retrofit analysis tool, 8:33451 (J:US)
Passive solar opportunities in commercial buildings: technical insights and a model for professional development, 8:33500 (J:US)
Passive solar in the city: 93 townhouses near Portland, Oregon, 8:33505 (J:US)
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Performance assessment of a utility-sponsored passive solar home program, 8:33463 (J:US)
Portfolio of passive solar homes designed, constructed and marketed by New York State Builders/Developers, 8:33490 (J:US)
Results of the Washington Passive Solar Design/Build Competition, 8:33510 (J:US)
Solar Spec, 8:33491 (J:US)

Economic Analysis
Denver Metro Solar House: incremental costs and payback analysis, 8:33297 (J:US)
Economic analysis of selected passive solar commercial buildings, 8:33502 (J:US)
Education
Laboratory experiments in building climatology, 8:33484 (J:US)
Passive solar energy education and training courses, 8:33489 (J:US)
Energy Balance
Performance analysis methodology for passive heating systems in the NSDN, 8:33415 (J:US)
Equipment Interfaces
Photovoltaics and passive: the house of the future, 8:33363 (J:US)
Holography
Visualization by holographic interferometry of temperatures in passive components, 8:33442 (J:US)
Legal Incentives
Ashland, Orgen's solar strategy, 8:33311 (J:US)
Life-Cycle Cost
Life-cycle cost economic optimization of insulation, infiltration and solar aperture in passive solar houses, 8:33296 (J:US)
Maintenance
Critical users' manual for passive solar homes, 8:33476 (J:US)
Marketing
Approaching the retrofitting market successfully, 8:33314 (J:US)
Building and marketing passive solar homes, 8:33495 (J:US)
Marketable passive solar housing design for merchant builders, 8:33493 (J:US)
Marketing passive solar energy to the building industry, 8:33318 (J:US)
Solar homebuilders program: getting builders to build solar, 8:33317 (J:US)
Meetings
6th national passive-solar conference, 8:33413 (B:US)
Optimization
Joint optimization of solar and superinsulation in a cold climate, 8:33443 (J:US)
Life-cycle cost economic optimization of insulation, infiltration and solar aperture in passive solar houses, 8:33296 (J:US)
Parametric Analysis
Parametric study of a passive solar-heated house with special attention on evaluating occupant thermal comfort, 8:33479 (J:US)
Performance
Comparison of monitored passive buildings, 8:33425 (J:US)
Direct estimation of the performance of passive structures, 8:33450 (J:US)
Evaluation of the Los Alamos Scientific Laboratory's residential passive solar methods applied to small commercial buildings, 8:33464 (J:US)
New quick-and-easy performance prediction method, 8:33457 (J:US)
Non-instrumented performance evaluation of 335 passive solar homes, 8:33414 (J:US)
Passive solar residential Class C monitoring program in the Northeast Region, 8:33416 (J:US)
Passive solar greenhouse retrofits: a precursor to an integrated biomass conversion system, 8:33524 (J:US)
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Performance assessment of a utility-sponsored passive solar home program, 8:33463 (J:US)
Performance Testing
Natural convection heating system: off-the-wall evaluation methods, 8:33428 (J:US)
Novel analysis technique used in the Oregon passive monitoring project, 8:33421 (J:US)
Passive research and practice, 8:33406 (R:US)
Performance analysis methodology for passive heating systems in the NSDN, 8:33415 (J:US)
Solar homebuilders program: getting builders to build solar, 8:33317 (J:US)
Study of solar and energy conserving houses in California: preliminary results, 8:33447 (J:US)
Utility impact and thermal performance of the Frants residence, 8:33506 (J:US)
Planning
Design implications and potentials of passive solar heating in higher density communities: the Lykovrissi Solar Village, 8:33512 (J:US)
Program Management
Solar Spec, 8:33491 (J:US)
Research Programs
Passive research and practice, 8:33406 (R:US)
Retrofitting
Approaching the retrofitting market successfully, 8:33314 (J:US)
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)
New York State passive solar design and retrofit competition, 8:33527 (J:US)
Passive solar retrofit analysis tool, 8:33451 (J:US)
Passive solar greenhouse retrofits: a precursor to an integrated biomass conversion system, 8:33524 (J:US)
Passive solar retrofitting: generalizing from a case study, 8:33528 (J:US)
Passive solar energy retrofit for energy efficient housing in hot humid climates, 8:33531 (J:US)
Sensible Heat Storage
Heat storage and distribution inside passive-solar buildings, 8:33407 (R:US)
Site Selection
Climatological sundial, 8:33469 (J:US)
Solar Air Heaters
Natural convection heating system: off-the-wall evaluation methods, 8:33428 (J:US)
Solar Fraction
Comparison of measured and predicted thermal performance of passive solar residences, 8:33466 (J:US)
Direct estimation of the performance of passive structures, 8:33450 (J:US)
Passive solar performance fraction relative to the actual building, 8:33462 (J:US)
Simple method for determining the average temperature, the temperature variation and the solar fraction for passive solar buildings, 8:33455 (J:US)
Thermal Analysis
Simple method for determining the average temperature, the temperature variation and the solar fraction for passive solar buildings, 8:33455 (J:US)
Thermal Comfort
Impact of consumer/client issues on passive solar design, 8:33474 (J:US)
Parametric study of a passive solar-heated house with special attention on evaluating occupant thermal comfort, 8:33479 (J:US)
Weather
Design days for passive solar, 8:33472 (J:US)
Windows
Windows as cost effective solar collectors, 8:33501 (J:US)
Zones
Integrating passive solar systems with exciting architectural form, 8:33513 (J:US)

PASSIVE SOLAR WATER HEATERS
Comparative Evaluations
Comparative performance indices for solar batch water heaters, 8:33433 (J:US)
Passive solar D.H.W. performance with lower costs in freezing climates, 8:33430 (J:US)
Side by side comparison study of integral passive solar water heaters, 8:33434 (J:US)
Flat Mirrors
Preliminary optical performance study of glazing-reflector systems in breadbox water heaters, 8:33439 (J:US)
Materials
Integral passive solar water heater performance, 8:33435 (J:US)
Performance
Comparative performance indices for solar batch water heaters, 8:33433 (J:US)

Performance of two passive domestic hot water systems, 8:33432 (J:US)
Performance Testing
Development of facilities and methods for thermal performance tests of passive domestic hot water systems, 8:33441 (J:US)
Integral passive solar water heater performance, 8:33435 (J:US)
Passive solar D.H.W. performance with lower costs in freezing climates, 8:33430 (J:US)
Side by side comparison study of integral passive solar water heaters, 8:33434 (J:US)
Test Facilities
Development of facilities and methods for thermal performance tests of passive domestic hot water systems, 8:33441 (J:US)
Thermosyphons
Passive solar D.H.W. performance with lower costs in freezing climates, 8:33430 (J:US)
PATIENTS
Delayed Radiation Effects
Spondylarthritis Ankylopoietica and its treatment with thorium X. Follow-up examinations carried out on patients of the Orthopaedic University Clinics Wuerzburg (Universitaetsklinik Wuerzburg), 8:34529 (R:DE:In German)
PCB
See CHLORINATED AROMATIC HYDROCARBONS
PDP REACTOR
Electrical Equipment
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactor Fueling
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Instrumentation
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Maintenance
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
PEAT
Drying
Drying of peat and wood biomass. Literature review, 8:33357 (R:FI:In Finnish)
TORVLINE - a digging system for peat evaluated from the point of national economy, 8:33076 (R:SE:In Swedish)
Excavation
TORVLINE - a digging system for peat evaluated from the point of national economy, 8:33076 (R:SE:In Swedish)
Hydraulic Transport
Pumping of peat slurry - at long distances, 8:33081 (R:SE:In Swedish)
Mining
TORVLINE - a digging system for peat evaluated from the point of national economy, 8:33076 (R:SE:In Swedish)
Processing
Evaluation of the decantation centrifuge process, 8:33080 (R:SE:In Swedish)
Water Removal
Evaluation of the decantation centrifuge process, 8:33080 (R:SE:In Swedish)
PEBBLE BED REACTORS
See also AVR REACTOR
THTR-300 REACTOR
Computerized Simulation
Dynamic modeling of an HTGR pebble bed reactor, 8:33683 (RA:IL)
Fuel Spheres
Graphitic matrix materials for spherical HTR fuel elements, 8:33685 (R:DE:In German)
Reactor Accidents
REACT/THERMIX - a computer code to calculate graphite corrosion due to accidents in pebble-bed reactors, 8:33747 (R:DE:In German)
PELLETS (FUEL)
See FUEL PELLETS
PENETRATORS
Acceleration
Analytical and experimental studies on penetration into geological targets, 8:34225 (R:US)
PENNSYLVANIA
Black Shales
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Natural Gas Deposits
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws the legislature, the administration, 8:33197 (R:US)
2,4-PENTANEDIONE
See ACETYLACETONE
PEOPLE
See HUMAN POPULATIONS
PEOPLES REPUBLIC OF CHINA
See CHINA
PERFORMANCE TESTING
Linear Accelerators
Coming in close with Minac, 8:33731 (J:US)
PEROXY RADICALS
Enthalpy
Standard enthalpy of formation of peroxymonosulfate (HSO_5p) and the standard electrode potential of the peroxymonosulfate-bisulfate couple, 8:33277 (J:GB)
Redox Potential
Standard enthalpy of formation of peroxymonosulfate (HSO_5^-) and the standard electrode potential of the peroxymonosulfate-bisulfate couple, 8:33277 (J:GB)
PERSONNEL
Studies of groups of persons employed in a particular field of endeavor. For studies on individuals in a group see also MAN.
See also DIAL PAINTERS
MINERS
PROFESSIONAL PERSONNEL
REACTOR OPERATORS
Mortality
Carcinogen assessment of coke oven emissions (revised draft), 8:33100 (R:US)
PERSONNEL DOSIMETRY
Energy dependence of some current personnel neutron dosemeters, 8:34366 (RA:CS:In Czech)
Comparative Evaluations
Personal passive monitors for chemical agents. Technical report, 8:34404 (R:US)
Dielectric Track Detectors
Comparison of polycarbonate and CR-39 foils as passive detectors in the wide energy range personnel neutron dosimeter, 8:34357 (RA:IL)
Thermoluminescent Dosemeters
Application of TL evaluation equipment in personnel dosimetry - type NHZ-203 imported from Hungary, 8:34369 (RA:CS:In Czech)
PERSONNEL FILM DOSIMETRY
See PERSONNEL DOSIMETRY
PERSONNEL MONITORING
Li-Drifted Ge Detectors
Use of Ge(Li) spectrometry in monitoring personnel and environment. I, 8:34368 (RA:CS:In Czech)
PETROLEUM
Limited to crude oil; see also COAL LIQUIDS, SHALE OIL, etc.
See also RESIDUAL PETROLEUM
Biodegradation
Microbial processes in the recovery of heavy petroleum, 8:33115 (RA:US)

Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA:US)
Microbial enhancement of oil recovery in North Sea reservoirs: a requirement for anaerobic growth on crude oil, 8:33124 (RA:US)
Chemical Analysis
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
Chemical Properties
Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA:US)
Contamination
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
Economic Impact
Interdependence between energy supply and the economy as a whole as an economic problem (Federal Republic of Germany), 8:33851 (R:DE:In German)
Enhanced Recovery
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Liquid fossil-fuel technology. Quarterly technical progress report, October-December 1982, 8:33129 (R:US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
Fermentation
Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry, 8:33107 (RA:US)
Forecasting
1982 annual energy outlook: with projections to 1990 (1982-1990), 8:33146 (R:US)
Fuel Consumption
Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs, 8:33148 (R:AT:In German)
Market
1982 annual energy outlook: with projections to 1990 (1982-1990), 8:33146 (R:US)
Microbial EOR
International conference on microbial enhancement of oil recovery, 8:33104 (R:US)
Nigeria
Nigeria - energy situation 1981, 8:33839 (R:DE:In German)
Physical Properties
Microbial activities and changes in the chemical physical properties of oil, 8:33116 (RA:US)
Prices
Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea, 8:33797 (R:DE)
Production
Microbial enhancement of oil recovery in Romania, 8:33122 (RA:US)
Refining
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
Research Programs
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
Reserves
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)

PETROLEUM COKE
See COKE

PETROLEUM DEPOSITS
See also OIL FIELDS
Stratigraphy
Oil and gas data from Paleozoic rocks in the Appalachian Basin: maps for assessing hydrocarbon potential and thermal maturity (conodont color-alteration isograds and overburden isopachs), 8:33102 (R:US)

PETROLEUM INDUSTRY
Annual report 1981 of Fachverband der Erdoelindustrie Oesterreichs (Austria), 8:33148 (R:AT:In German)
Environmental Impacts
Assessment of the living marine resources of the central Bering Sea and potential resource use conflicts between commercial fisheries and petroleum development in the Navarin Basin, proposed sale no. 83, 8:33156 (R:US)
Statistical Data
International energy statistical review. Monthly reports, 8:33842 (R:US)

PETROLEUM RESIDUES
B.P. over 1100°F, 593°C; includes oil residues, residua.
Hydrogenation
Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R:DE:In German)
Pyrolysis
Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R:DE:In German)

PETT
See POSITRON COMPUTED TOMOGRAPHY

PHAGES
See BACTERIOPHAGES

PHASE CHANGE MATERIALS
Use with the specific phase change material (e.g. calcium chloride) when known.
Performance Testing
Comparison of testing methods for latent-heat-storage devices, 8:33548 (R:US)

PHASE TRANSFORMATIONS
See also MELTING
Statistical Models
Majority rule model: real space renormalition group solution and finite size scaling, 8:34862 (R:BR)

PHASEOLUS
Germination
Germination and growth effects of hexavalent chromium in Orocol TL (a corrosion inhibitor) on Phaseolus vulgaris, 8:34614 (RA:US)
Plant Growth
Germination and growth effects of hexavalent chromium in Orocol TL (a corrosion inhibitor) on Phaseolus vulgaris, 8:34614 (RA:US)

PHENANTHRENE
Excitation
Nonlinear polariton effects in the phenanthrene crystal, 8:34152 (J:NL)
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)

PHENANTHROLINES
Excited States
Temperature dependence of the lifetimes of the ligand-field states of tris(1,10-phenanthroline)iron(II), 8:34183 (J:NL)

PHENOL
Biodegradation
Phenol degradation in a three-phase fluidized-bed bioreactor, 8:33058 (R:US)
Biological Effects
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)
Oxidation
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment (In autoclaves: 130 to 250°C; 6 to 11 MPa oxygen; in water solution), 8:32960 (R:US)

PHENOLS
See also PHENOL
Adsorption
Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R:DE:In German)

PHENYLAMINE
See ANILINE
PHENYLETHYLENE
See STYRENE
PHORBOL ESTERS
Carcinogenesis
Resistance of germ-free athymic nude mice to two-stage skin carcinogenesis, 8:34644 (BA:US)
PHOSPHATIDES
See PHOSPHOLIPIDS
PHOSPHINES
Chemical Reaction Kinetics
Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes, 8:34107 (J:NL)
Photolysis
147-nm photolysis of phosphine-silane mixtures, 8:34190 (J:CH)
PHOSPHODIESTERASES
Code number 3.1.4.
See also RNA-ASE
Chemical Activation
Functional exchange of components between light-activated photoreceptor phosphodiesterase and hormone-activated adenylate cyclase systems, 8:34487 (J:US)
Photochemical Reactions
Reciprocal effects of an inhibitory factor on catalytic activity and noncatalytic cGMP binding sites of rod phosphodiesterase, 8:34488 (J:US)
Receptors
Functional exchange of components between light-activated photoreceptor phosphodiesterase and hormone-activated adenylate cyclase systems, 8:34487 (J:US)
Reciprocal effects of an inhibitory factor on catalytic activity and noncatalytic cGMP binding sites of rod phosphodiesterase, 8:34488 (J:US)
PHOSPHOLIPIDS
Biophysics
Biophysical studies of immune recognition, 8:34499 (RA:US)
PHOSPHORIC ACID
Environmental Transport
Aquatic ecology section, 8:34454 (RA:US)
PHOSPHORUS 32
Environmental Transport
Aquatic ecology section, 8:34454 (RA:US)
PHOSPHORUS 35
Search for new isotopes at Brookhaven, 8:34809 (J:US)
PHOSPHORUS COMPOUNDS
See also PHOSPHINES
Photochemical Reactions
UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake, 8:34443 (J:US)
Water Chemistry
UV-sensitive complex phosphorus: association with dissolved humic material and iron in a bog lake, 8:34443 (J:US)
PHOSPHORYLASES
See PHOSPHOTRANSFERASES
PHOSPHOTRANSFERASES
Code number 2.7.1
See also HEXOKINASE
Biochemistry
Marrow transfusions into normal recipients, 8:34478 (RA:US)
PHOTOCHEMICAL ENERGY STORAGE
Technology Assessment
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R:DE:In German)
PHOTOCHEMICAL REACTIONS
See also PHOTOSYNTHESIS
Research Programs
Question of mode-specificity in unimolecular reaction dynamics, 8:34178 (R:US)
PHOTODIODES
Radiation Effects
Radiation effects studies for the high-resolution spectrograph (Protons), 8:34246 (R:US)
PHOTODISINTEGRATION
See PHOTONUCLEAR REACTIONS
PHOTOELECTROCHEMICAL CELLS
Technology Assessment
Possibilities of increased energetic use of photochemical, photoelectrochemical and biological methods of solar energy conversion, 8:33319 (R:DE:In German)
PHOTOIONIZATION
Measuring Methods
Laser two-photon ionization spectroscopy of molecules in liquids, 8:34191 (J:NL)
PHOTOMAGNETOELECTRIC EFFECT
See MAGNETIC FIELDS
PHOTOMETERS
Chemical Radiation Effects
Evaluation of fiber optics for in-line photometry in hostile environments, 8:33185 (J:US)
Design
Automatic analyzers for monitoring water composition and their applications in nuclear power engineering, 8:33679 (RA:CS:In Czech)
PHOTON ACTIVATION ANALYSIS
See ACTIVATION ANALYSIS
PHOTON DETECTION (GAMMA)
See GAMMA DETECTION
PHOTON DETECTION (X-RAY)
See X-RAY DETECTION
PHOTON-ION COLLISIONS
Ionization
Photodetachment cross sections for He^- ($^4P^o$), 8:34729 (J:US)
PHOTON-MOLECULE COLLISIONS
Dissociation
New adiabatic approach to the photodissociation of polyatomic molecules, 8:34731 (J:US)
PHOTON-PHOTON INTERACTIONS
Photoproduction
Two photon physics with the TASSO detector, 8:34749 (R:DE)
PHOTONUCLEAR REACTIONS
Knock-Out Reactions
Threshold photoneutron angular distribution and polarization studies of nuclei, 8:34797 (J:US)
Reviews
Photon induced reactions, 8:34791 (R:DE)
PHOTOSYNTHESIS
Photosynthetic carbon metabolism in the submerged aquatic angiosperm Scirpus subterminalis, 8:34510 (J:NL)
Plant action spectra: some thoughts on development and use, 8:34646 (RA:DE)
Electron Transfer
Effect of UV irradiation on the primary processes of photosynthesis, 8:34582 (RA:DE)
PHOTOVOLTAIC POWER PLANTS
Design
Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report, 8:33361 (R:XE:FR)
Feasibility Studies
Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report, 8:33361 (R:XE:FR)
Systems Analysis
Conception, systems analysis, design, and experimentation of a photovoltaic autonomous 5 kW generator at the Refuge des Evettes site. Final report, 8:33361 (R:XE:FR)
PHOTOVOLTAIC POWER SUPPLIES
Design
Photovoltaic/passive solar residential systems, 8:33364 (J:US)
Equipment Interfaces
Photovoltaics and passive: the house of the future, 8:33363 (J:US)
Inverters
System analysis of the interconnection of 5-kW solar panels with the power lines. Final report, 8:33362 (R:XE)
Performance
Photovoltaic/passive solar residential systems, 8:33364 (J:US)

Rectifiers
System analysis of the interconnection of 5-kW solar panels with the power lines. Final report, 8:33362 (R:XE)

PHYSICS
See also ATOMIC PHYSICS
HIGH ENERGY PHYSICS
NUCLEAR PHYSICS
REACTOR PHYSICS
SOLID STATE PHYSICS
General and nuclear physics, 8:34793 (R:UA)
Meetings
Proceedings of the sixth symposium on theoretical physics. Nuclear physics, plasma physics and statistical mechanics, 8:34878 (R:BR)
Proceedings of the sixth symposium on theoretical physics. Solide state, biophysics and chemical physics, 8:34722 (R:BR)
Singularity
Breakdown of predictability: an investigation on the nature of singularities, 8:34888 (R:XA)

PHYSIOLOGY
Daily Variations
Chronon theory of circadian rhythm control, 8:34570 (BA:US)

PHYTOPLANKTON
Metabolism
Isolation of cyclic adenosine 3':5'-monophosphate (cAMP) from lakes of differing trophic status: Correlation with planktonic metabolic variables, 8:34445 (J:US)
Sample Preparation
Method for preparing permanent mounts of phytoplankton for critical microscopy and cell counting, 8:34563 (J:US)

PIGE ANALYSIS
See NUCLEAR REACTION ANALYSIS
PROTON REACTIONS

PIGMENT CELLS
See ANIMAL CELLS

PINES
Harvesting
Distribution of organic matter, carbon and plant nutrients in soil in the early phase after clearcutting of a scots pine forest; with and without removal of logging slash, 8:33345 (R:SE)
Productivity
Biomass of Scots pine (Pinus Sylvestris L.). Amount-development-methods for mensuration, 8:33355 (R:SE:In Swedish)
Yields
Biomass of Scots pine (Pinus Sylvestris L.). Amount-development-methods for mensuration, 8:33355 (R:SE:In Swedish)

PINS (FUEL)
See FUEL PINS

PION MINUS REACTIONS
Inelastic Scattering
Inelastic scattering of pions on nuclei with excitation of particle-hole states, 8:34764 (J:SU:In Russian)

PION MINUS-PROTON INTERACTIONS
Glueballs
Glueballs in the reaction $\pi p p \rightarrow$ phi phi n, 8:34746 (R:US)

PION PLUS REACTIONS
Inelastic Scattering
Inelastic scattering of pions on nuclei with excitation of particle-hole states, 8:34764 (J:SU:In Russian)

PIPELINE QUALITY GAS
See HIGH BTU GAS

PIPELINES
Construction
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983, 8:32949 (R:US)
Engineering
Great Plains Gasification Associates quarterly technical and environmental report, Great Plains Coal-Gasification Project, Mercer County, North Dakota. First quarter, 1983, 8:32949 (R:US)
Land Pollution Abatement
There's more to erosion control than protecting the pipe, 8:33164 (R:US)

PIPES
Dynamic Loads
Ocean thermal energy conversion cold water pipe workshop. Volume I of III, 8:33403 (R:US)
Mathematical Models
Ocean thermal energy conversion cold water pipe workshop. Volume I of III, 8:33403 (R:US)
Performance Testing
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
Positioning
Analysis of the up-ending problem of OTEC-1 cold water pipe, 8:33400 (RA:US)
Stress Analysis
Nuclear class 1 piping stress analysis (TRHEAT Code; NUPIPE Code), 8:33746 (RA:BR:In Portuguese)
Test Facilities
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Testing
Utilization of the oceans for sub-scale testing of OTEC components, 8:33391 (RA:US)
Thermal Insulation
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)

PITCH (REACTOR PARAMETERS)
See REACTOR LATTICE PARAMETERS

PLACENTA
Permeability
Plutonium movements across the haemochorial placenta of the guinea pig, 8:34608 (BA:GB)
Radionuclide Kinetics
Plutonium movements across the haemochorial of the guinea pig, 8:34609 (BA:GB)

PLANNED COMMUNITIES
Energy Efficiency
Between public and private: a new common ground, 8:33945 (J:US)
Passive Solar Heating Systems
Making of a solar village, 8:33310 (J:US)
Roosevelt Parkside: low income passive solar housing, 8:33480 (J:US)
Socio-Economic Factors
Between public and private: a new common ground, 8:33945 (J:US)
Solar Access
Solar access laws can benefit developers, 8:33316 (J:US)
Solar siting and access protection in new development, 8:33312 (J:US)

PLANTS
See also ALGAE
CATTAILS
FUNGI
GRASS
TREES
Photosynthesis
Photosynthetic carbon metabolism in the submerged aquatic angiosperm Scirpus subterminalis, 8:34510 (J:NL)
Radionuclide Migration
Soil and vegetation, 8:34429 (RA:US)
Radiosensitivity
UV-B sensitivity of plant photosynthesis as influenced by visible irradiation, 8:34652 (RA:DE)
Ultraviolet Radiation
Action spectra for the depression of photosynthesis by UV irradiation in Lactuca sativa L. and Rumex alpinus L., 8:34653 (RA:DE)
Carbon metabolism of plants exposed to UV-B radiation, 8:34656 (RA:DE)
Effect of UV on photosynthesis and growth in dependence of mineral nutrition (Lactuca sativa L. and Rumex alpinus L.), 8:34657 (RA:DE)
Phenylpropanoid pigment synthesis and growth reduction as adaptive reactions to increased UV-B radiation, 8:34655 (RA:DE)

UV-B radiation transmitting greenhouse for plant studies, 8:34651 (RA:DE)
PLANTS (INDUSTRIAL)
See INDUSTRIAL PLANTS
PLANTS (POWER)
See POWER PLANTS
PLASMA DIAGNOSTICS
Laser Radiation
Selection criteria on laser-detector systems for scattering-diagnostics of fusion-plasmas, 8:34896 (R:DE:In German)
Nuclear Reaction Yield
Utilization of the reaction $^{10}B(d,n)\ ^{11}C$ as a high temperature deuterium plasma diagnostic, 8:34804 (J:US)
Research Programs
The Pinhole/Occulter facility, 8:34689 (R:US)
X-Ray Spectra
Pulse pile-up effects, 8:34906 (R:US)
PLASMA FOCUS
Neutron Spectra
Theory of neutron spectra from d-d-reactions in the linear z-pinch and the plasma focus, 8:34897 (R:DE)
Turbulence
Calculation of turbulence phenomena in plasma focus dynamics using REDUCE, 8:34898 (R:DE)
PLASMA MACROINSTABILITIES
See also KINK INSTABILITY
Computer Codes
Application of the stellarator expansion for plasma-stability studies in stellarators, 8:34905 (R:US)
Three-Dimensional Calculations
MHD activity in the ISX-B tokamak: experimental results and theoretical interpretation, 8:34902 (R:US)
PLASMA OSCILLATIONS
See PLASMA WAVES
PLASMA WAVES
Bump-in-Tail Instability
Numerical simulation of echo phenomena in plasma, 8:34895 (R:DE:In German)
Two-Stream Instability
Numerical simulation of echo phenomena in plasma, 8:34895 (R:DE:In German)
PLATINUM
Catalytic Effects
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
Chemical Activation
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
Chemical Preparation
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
Deactivation
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
Performance
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
Surface Properties
Hydrogen chemisorpton on Pt single crystal surfaces in acidic solutions, 8:34133 (J:NL)
Pt/SiO_2. VI. The effects of pretreatment on structures, 8:34094 (J:US)
PLATINUM 194
Auger Effect
Intensities of Auger KL L transitions in $_{78}{}^{194}Pt$, 8:34724 (RA:SU:In Russian)
PLATINUM COMPLEXES
Optical Properties
Optical properties of linear chain haloamine platinum complexes, 8:34110 (BA:US)
PLESIOTHERAPY
See RADIOTHERAPY
PLUMES
Mathematical Models
Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks, 8:34415 (R:US)
Representativeness of calculated peak and annual average concentrations, 8:34413 (R:US)
Radionuclide Migration
Representativeness of calculated peak and annual average concentrations, 8:34413 (R:US)
PLUTONIUM
Adsorption
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
Deposition
Comparison of simulated to actual plutonium deposition at the Savannah River Plant, 8:34414 (R:US)
Ion Emission
Simple method to enhance thermal emission of metal ions, 8:34074 (J:NL)
Leaching
Effect of radiolysis on leachability of plutonium and americium from 76-101 glass, 8:34042 (R:US)
Radiochemical Analysis
Hybrid chemical and nondestructive analysis technique, 8:34054 (R:US)
Plutonium separations, 8:34060 (R:US)
Recovery
Management of plutonium contaminated waste, 8:33237 (B:US)
Reduction
Testing and economical evaluation of U(IV) in Purex, 8:33183 (R:US)
Sampling
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:33256 (R:US)
Solvent Extraction
Plutonium separations, 8:34060 (R:US)
PLUTONIUM 238
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
PLUTONIUM 239
Alpha Spectra
Alpha spectrum profiling of plutonium in leached simulated high-level radioactive waste-glass, 8:33238 (J:US)
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Membrane Transport
Plutonium movements across the haemochorial of the guinea pig, 8:34609 (BA:GB)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Soil and vegetation, 8:34429 (RA:US)
Radionuclide Kinetics
Plutonium movements across the haemochorial placenta of the guinea pig, 8:34608 (BA:GB)
PLUTONIUM 239 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J:US)
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J:US)
PLUTONIUM 240
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Soil and vegetation, 8:34429 (RA:US)

PLUTONIUM 240 TARGET
Neutron Reactions
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
PLUTONIUM 241 TARGET
Neutron Reactions
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
PLUTONIUM 242 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
PLUTONIUM CARBIDES
Physical Radiation Effects
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R:US)
PLUTONIUM DIOXIDE
Structural Chemical Analysis
Determination of plutonium dioxide surface areas from x-ray crystallite sizes, 8:33182 (J:US)
Surface Area
Determination of plutonium dioxide surface areas from x-ray crystallite sizes, 8:33182 (J:US)
PLUTONIUM ISOTOPES
See also PLUTONIUM 238
PLUTONIUM 239
PLUTONIUM 240
Gamma Spectroscopy
Plutonium isotopic measurement for small product samples, 8:34055 (R:US)
Isotope Ratio
Plutonium isotopic measurement for small product samples, 8:34055 (R:US)
PLUTONIUM RECYCLE
Computer Calculations
Improvement of reactor physics design methods for plutonium recycling in pressurized water reactors, 8:33702 (R:DE:In German)
Demonstration Programs
Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant, 8:33666 (R:DE:In German)
Economics
Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R:DE:In German)
Three-Dimensional Calculations
Improvement of reactor physics design methods for plutonium recycling in boiling water reactors (BPSPU code), 8:33663 (R:DE:In German)
PMMA
Photolysis
Photoprocesses in copolymers of methacrylophenone with methyl methacrylate: photodegradation and intramolecular energy migration, 8:34180 (J:US)
PNA
See POLYCYCLIC AROMATIC HYDROCARBONS
PNEUMATIC TRANSPORT
Pressure Drop
Pressure losses in pneumatic transport. A model based on particle-wall interactions and particle density distribution, 8:34236 (R:US)
PNL
See BATTELLE PACIFIC NORTHWEST LABORATORIES
POCKET CALCULATORS
See CALCULATORS
POINT DEFECTS
Differential PAC
Facility for studying radiation damage of structural materials by the differential perturbed angular correlation method, 8:34474 (RA:SU:In Russian)
POISEUILLE FLOW
See LAMINAR FLOW
POISONS (CHEMICAL)
See HAZARDOUS MATERIALS
POLAR COMPOUNDS
Dielectric Properties
Simulation of polar and polarizable fluids, 8:34742 (J:US)
Light Scattering
Simulation of polar and polarizable fluids, 8:34742 (J:US)
POLARIMETERS
See also ELLIPSOMETERS
Design
Differential scattering of circularly polarized light by the helical sperm head from the octopus Eledone cirrhosa, 8:34056 (RA:US)
POLARIZED TARGETS
Target Chambers
Dynamic deuteron polarization measurements performed in a new type of horizontal dilution cryostat, 8:34304 (R:DE)
POLICY
See ENERGY POLICY
ENVIRONMENTAL POLICY
GOVERNMENT POLICIES
POLLUTION CONTROL
Methods of controlling and removing pollution once it has occurred.
See also AIR POLLUTION CONTROL
Meetings
1982 UCC-ND/GAT environmental protection seminar: proceedings, 8:34449 (R:US)
POLLUTION CONTROL EQUIPMENT
See also SCRUBBERS
Maintenance
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)
Reliability
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)
POLLUTION REGULATIONS
Regulations for nonradioactive pollution only; see also CONTAMINATION REGULATIONS.
Cost Benefit Analysis
Relaxation of SO_2 emission limits for the PGDP steam plant, 8:34420 (RA:US)
POLYACRYLONITRILE
See ORGANIC POLYMERS
POLYAMIDES
Biodegradation
Microbial interactions with polyacrylamide polymers, 8:33120 (RA:US)
POLYATOMIC MOLECULES
Photon-Molecule Collisions
New adiabatic approach to the photodissociation of polyatomic molecules, 8:34731 (J:US)
POLYCYCLIC AROMATIC HYDROCARBONS
Air Pollution Control
Formation and reduction of NO sub (x) and POM in coal firing, 8:33057 (R:SE:In Swedish)
Biological Accumulation
Advanced fossil energy program, 8:34452 (RA:US)
POLYCYTHEMIA
Pathology
Regulation of red blood cell production in human beings by erythropoietin, 8:34477 (RA:US)
POLYENES
Energy-Level Transitions
Singlet-singlet absorption spectra of diphenylpolyenes, 8:34179 (J:NL)
Photolysis
Singlet-singlet absorption spectra of diphenylpolyenes, 8:34179 (J:NL)
POLY(ISOBUTYLENE OXIDE)
See EPOXIDES
ORGANIC POLYMERS
POLYMER FLOODING
See MICROEMULSION FLOODING
POLYMERS
See also ELASTOMERS
ORGANIC POLYMERS
SILICONES
Configuration
Properties of two-dimensional polymers, 8:34018 (J:US)

Physical Properties
Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R:US)
Positrons
Positron lifetime studies in thermoplastic polyimide test specimens, 8:34016 (R:US)
Separation Processes
Pilot microscreen separation of Sclerotium rolfsii biomass and broth, 8:33136 (J:US)

POLYMETHYLMETHACRYLATES
See PMMA

POLYNUCLEAR AROMATIC HYDROCARBONS
See POLYCYCLIC AROMATIC HYDROCARBONS

POLYPROPYLENE
Dielectric Properties
Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA:US)

POLYSACCHARIDES
See also CELLULOSE
Biosynthesis
Microbial polysaccharide produced from crude oil or liquid paraffin and its application in petroleum industry, 8:33107 (RA:US)

POLYTETRAOXANE
See ORGANIC POLYMERS

POLYTHIONATES
See SULFUR COMPOUNDS

POLYTHIONIC ACIDS
See SULFUR COMPOUNDS

POLY(VINYLIDENE FLUORIDE)
See FLUORINATED ALIPHATIC HYDROCARBONS

POPLARS
Insects
Insect damage to fast growing Salix and Populus species, 8:33333 (R:SE:In Swedish)

PORK
See MEAT

POSITION SENSITIVE DETECTORS
Large-area non-crystalline semiconductor detectors, 8:34379 (R:US)

POSITIVE IONS
See CATIONS

POSITRON COMPUTED TOMOGRAPHY
Design
Positron emission tomography: instrumentation perspectives, 8:34557 (B:US)
Performance Testing
Positron emission tomography: instrumentation perspectives, 8:34557 (B:US)
Spatial Resolution
New instrumentation for high-resolution, dynamic, three-dimensional tomography of positron-labeled compounds in the human body, 8:34378 (RA:US)

POSITRON SOURCES
Diagnostic Uses
Radionuclide generators and cyclotron produced positron emitters for synthesis of biochemical substrates, 8:34544 (RA:US)
Sodium 22
Emission spectrum of a positron source on the base of ^{22}Na, 8:34536 (RA:SU:In Russian)

POSTULATED PARTICLES
See also PARTONS
QUARKS
Second Z in SO(10), 8:34766 (R:US)

POTABLE WATER
See DRINKING WATER

POTASSIUM
Desorption
Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J:NL)

POTASSIUM IONS
Energy-Level Transitions
Lifetimes of low-lying $^1P^o$, ^3D, and $^3F^2$ states of the Al I isoelectronic sequence, 8:34730 (J:SE)

POTASSIUM OXIDES
Chemical Reactions
Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J:NL)
Optical Properties
Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J:NL)

POTASSIUM SULFATES
Excitation
Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures, 8:34134 (J:GB)
Raman Spectra
Raman spectroscopy of oxyanions in molten salts. Part 1. Analysis of the asymmetric stretching band in molten Li_2SO_4 and Li_2SO_4-K_2SO_4 mixtures, 8:34134 (J:GB)

POULTRY
See FOWL

POWER DISTRIBUTION SYSTEMS
Construction
New tools to cut labor costs, 8:33661 (J:US)
Gas-Insulated Substations
77kV new type all-in-one SF_6 gas-insulated switchgear, 8:33647 (RA:US)
Maintenance
New tools to cut labor costs, 8:33661 (J:US)

POWER PLANTS
See also DUAL-PURPOSE POWER PLANTS
FUEL CELL POWER PLANTS
HYDROELECTRIC POWER PLANTS
WIND POWER PLANTS
Risk Assessment
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)
System Failure Analysis
Development and application of risk-analysis techniques and associated data bases. Final report, 1 September 1981-15 May 1983, 8:34956 (R:US)

POWER POOLS
See INTERCONNECTED POWER SYSTEMS

POWER REACTORS
See also ANGRA-1 REACTOR
AVR REACTOR
BIBLIS-3 REACTOR
CATAWBA-1 REACTOR
CATAWBA-2 REACTOR
CLINCH RIVER BREEDER REACTOR
DRESDEN-2 REACTOR
DRESDEN-3 REACTOR
HBWR REACTOR
LINGEN REACTOR
OBRIGHEIM REACTOR
QUAD CITIES-1 REACTOR
QUAD CITIES-2 REACTOR
RANCHO SECO-1 REACTOR
RWE-BAYERNWERK REACTOR
SALEM-1 REACTOR
SEABROOK-1 REACTOR
SEABROOK-2 REACTOR
SPACE POWER REACTORS
THREE MILE ISLAND-1 REACTOR
THREE MILE ISLAND-2 REACTOR
THTR-300 REACTOR
WUERGASSEN REACTOR
WYHL-1 REACTOR
Failure Mode Analysis
Implementing quantitative analysis and its complement, 8:33772 (BA:US)
Risk Assessment
Implementing quantitative analysis and its complement, 8:33772 (BA:US)

POWER SUPPLIES
See also PHOTOVOLTAIC POWER SUPPLIES
Auxiliary Systems
Emergency power supply, 8:33784 (B:DE)
Failures
Station Blackout accident analyses (Part of NRC Task Action Plan A-44) (PWR; BWR), 8:33767 (R:US)
Meetings
Emergency power supply, 8:33784 (B:DE)

POWER SYSTEMS
Includes electric power networks with associated generating and transmission facilities.
See also INTERCONNECTED POWER SYSTEMS
Control
Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach, 8:33654 (R:US)
Electromagnetic Pulses
Program plan for research and development of technologies and systems for electric-power systems under the influence of nuclear electromagnetic pulses, 8:33659 (R:US)
Oscillations
Study of nonlinear oscillations due to exciter control, 8:33657 (R:US)
Study of nonlinear oscillations due to exciter control using Hopf bifurcation, 8:33652 (R:US)
Power Distribution
Analysis of power flows without solving power flow equations, 8:33655 (R:US)
Analysis of linearized decoupled power-flow approximations for steady-state security assessment, 8:33653 (R:US)
Analysis of linearized decoupled power-flow approximations for steady-state security assessment, 8:33656 (R:US)
Security
Generation scheduling to maximize expected time to insecurity: a stochastic optimal control approach, 8:33654 (R:US)
Power-system security assessment and control, 8:33650 (R:US)
POWER TRANSMISSION
See also OVERHEAD POWER TRANSMISSION
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
POWER TRANSMISSION LINES
Circuit Breakers
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Corona Discharges
Air insulation behaviour under oscillating impulses, 8:33631 (RA:US)
Comments on the Carrara-Thione breakdown model of long air gap during positive switching surges, 8:33632 (RA:US)
Non-uniform field breakdown: engineering models, 8:33628 (RA:US)
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
Economics
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
Electrical Insulation
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
Electrical Insulators
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Failures
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
Flashover
Non-uniform field breakdown: engineering models, 8:33628 (RA:US)
Parameters influencing the switching surge strength of transmission line air insulation, 8:33630 (RA:US)
Lightning
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Lightning Arresters
Practical problems of impulse breakdown requiring a physical approach, 8:33629 (RA:US)
Mechanical Structures
Technical and economic characteristics of high-phase-order power transmission, 8:33658 (R:US)
Wind Loads
Longitudinal unbalanced loads on transmission-line structures: documentation of computer programs BRODI2 and BROFLX, 8:33660 (R:US)
PRASEODYMIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
PRASEODYMIUM 144
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
PRECIPITATIONS (ATMOSPHERIC)
See ATMOSPHERIC PRECIPITATIONS
PRECOMPOUND-NUCLEUS EMISSION
Particle-Hole Model
Pairing correction for particle-hole state densities, 8:34846 (R:US)
PREEQUILIBRIUM NUCLEAR PROCESSES
See PRECOMPOUND-NUCLEUS EMISSION
PREGNANCY
Diagnostic Techniques
Use of serum progesterone levels to detect pregnancy in elk, 8:34567 (J:US)
PRESSURE TUBES
Crack Propagation
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)
Fabrication
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
PRESSURE (VAPOR)
See VAPOR PRESSURE
PRESSURE VESSELS
Nozzles
Underclad cracking in PWR reactor vessels, 8:33681 (TG:GB)
Stress Analysis
Slideline verification for multilayer pressure vessel and piping analysis, 8:33726 (R:US)
Stresses
Programmable calculator stress analysis, 8:34213 (R:US)
Thermal Stresses
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface (PWR), 8:33765 (R:US)
PRESSURIZED WATER COOLED MODERATED REACTO
See PWR TYPE REACTORS
PRESSURIZED WATER REACTORS
See PWR TYPE REACTORS
PRICES
Prior to June 1979, CHARGES was used.
Deregulation
Supplemental analysis of natural-gas-consumer regulatory-reform legislation, 8:33163 (R:US)
PRIMARY COOLANT CIRCUITS
See also COOLANT CLEANUP SYSTEMS
Fluid-Structure Interactions
Measurement of crossflow forces on tubes, 8:33724 (R:US)
Pressure Gradients
Theory and application of a three-dimensional code SHAPS to complex piping systems (LMFBR), 8:33740 (R:US)
Simulation
Design of a pressurized water loop heated by electric resistances, 8:33669 (RA:BR:In Portuguese)
Stress Analysis
Slideline verification for multilayer pressure vessel and piping analysis, 8:33726 (R:US)
Temperature Gradients
Theory and application of a three-dimensional code SHAPS to complex piping systems (LMFBR), 8:33740 (R:US)
Thermal Stresses
Theory and application of a three-dimensional code SHAPS to complex piping systems (LMFBR), 8:33740 (R:US)
Turbulent Flow
Measurement of crossflow forces on tubes, 8:33724 (R:US)
PROCESS CONTROL
Microprocessors
Assembler routines for process-control using the microcomputers Commodore cbm 3032/4032/8032, 8:34965 (R:DE:In German)

PROCESS DEVELOPMENT PILE
See FDP REACTOR
PROCESS HEAT REACTORS
Coal Gasification
Studies on the choice of reactor inlet- and outlet temperatures in a nuclear process heat reactor for hydrogasification of brown coal, 8:33707 (R:DE:In German)
District Heating
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R:US)
PROCESSING (DATA)
See DATA PROCESSING
PROCESSING (WASTES)
See WASTE PROCESSING
PRODUCER GAS
130 to 140 Btu/ft³.
Testing
Agricultural residues as fuel for producer gas generation. Report from a test series with coconut shells, coconut husks, wheat straw and sugar cane., 8:33351 (R:SE)
PRODUCTION (HYDROGEN)
See HYDROGEN PRODUCTION
PRODUCTION (ISOTOPE)
See ISOTOPE PRODUCTION
PRODUCTION (PAIR)
See PAIR PRODUCTION
PROFESSIONAL PERSONNEL
Education
Doctoral scientists and engineers working in energy-related activities, 1981, 8:34952 (R:US)
Occupations
Doctoral scientists and engineers working in energy-related activities, 1981, 8:34952 (R:US)
PROGRAM MANAGEMENT
Investigations
Office of Inspector General FY 1983 semiannual report, October 1, 1982-March 31, 1983, 8:33785 (R:US)
PROGRAMMING
Limited to computer programming.
Optimization
Testing unconstrained optimization software, 8:34974 (J:US)
Secrecy Protection
Are most low-density knapsacks solvable in polynomial time, 8:34966 (R:US)
PROGRAMMING LANGUAGES
Structured multi-stream command language, 8:34926 (R:US)
PROJECT MANAGEMENT
See PROGRAM MANAGEMENT
PROJECT THUNDERBIRD
See THUNDERBIRD PROJECT
PROLACTIN
See LTH
PRONGS
See PARTICLE TRACKS
PROPANE
Adsorption Isotherms
Adsorption of propane on activated carbon at 25°C, 8:34162 (J:GB)
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
PROPENE
See PROPYLENE
PROPHASE
See MITOSIS
PROPORTIONAL COUNTERS
See also HE-3 COUNTERS
MULTIWIRE PROPORTIONAL CHAMBERS
Technology Assessment
Routine apparatus for marine ^{85}Kr-samples, 8:34468 (R:DE:In German)
PROPYLENE
Electron Collisions
Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_3F_6), 8:34699 (RA:US)
Excitation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
Ionization
Mobility and recombination of ions and the effective ionization coefficient in hexafluoropropene (C_3F_6), 8:34699 (RA:US)
Relaxation
Infrared fluorescence studies of intramolecular vibrational relaxation in C_1-C_4 hydrocarbons following pulsed laser excitation of the first CH stretch overtone, 8:34148 (J:NL)
PROTACTINIUM 234
Gamma Detection
Solid waste disposal system, 8:33193 (RA:US)
PROTECTION
See SAFETY
PROTECTION (RADIATION)
See RADIATION PROTECTION
PROTECTIVE COATINGS
Chemical Vapor Deposition
Coatings for elevated temperature wear resistance, 8:34002 (BA:US)
Wear Resistance
Coatings for elevated temperature wear resistance, 8:34002 (BA:US)
PROTEINS
See also CASEIN
HISTONES
LIPOPROTEINS
METALLOTHIONEIN
Bioassay
Microbial biomass in oil shale wastewaters: quantitation as protein, 8:33174 (RA:US)
Biosynthesis
Identification and partial purification of the error-prone repair gene products of bacteriophage T4, 8:34559 (RA:US)
Electrophoresis
Use of carbamylated charge standards for testing batches of ampholytes used in two-dimensional elecrophoresis, 8:34175 (J:DE)
Purification
Identification and partial purification of the error-prone repair gene products of bacteriophage T4, 8:34559 (RA:US)
PROTEOLIPIDS
See LIPOPROTEINS
PROTON BEAMS
X-Ray Fluorescence Analysis
X-ray fluorescence analysis using crystal-diffraction spectrometer with proton excitation, 8:34538 (RA:SU:In Russian)
PROTON REACTIONS
Capture
Nuclear cross sections for light ions on ^{6}Li, 8:34800 (J:US)
Proton capture to excited states of ^{16}O; MI, EI and Gamow-Teller transitions and shell-model calculations, 8:34799 (R:US)
Cross Sections
Simple parameterization for optical reaction cross sections, 8:34850 (J:US)
Elastic Scattering
Elastic and inelastic scattering of polarized protons from ^{206}Pb near isobaric analog resonances, 8:34834 (R:US)
Inelastic Scattering
Elastic and inelastic scattering of polarized protons from ^{206}Pb near isobaric analog resonances, 8:34834 (R:US)
PROTON SPECTROMETERS
Technology Assessment
Device for study on the (p, pn) reactions, 8:34537 (RA:SU:In Russian)
PROTON-PROTON INTERACTIONS
Multiple Production
Multigamma-ray events at the CERN ISR, 8:34754 (J:NL)

Transverse momentum structures of charged particle final states from proton-proton collisions with a charged trigger particle of large transverse momentum, 8:34748 (R:US)

PROTONS
Pair Production
Two photon physics with the TASSO detector, 8:34749 (R:DE)

PSEUDOMONAS
Cell Cultures
Microbial interactions with polyacrylamide polymers, 8:33120 (RA:US)

PSI-3105 RESONANCES
Radiative Decay
Charmonium spectroscopy from radiative decays of the J/psi and psi', 8:34753 (R:US)

PSI-3695 RESONANCES
Radiative Decay
Charmonium spectroscopy from radiative decays of the J/psi and psi', 8:34753 (R:US)

PSYCHOSES
See MENTAL DISORDERS

PUBLIC BUILDINGS
Daylighting
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Direct Gain Systems
Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California, 8:33518 (J:US)
Passive Solar Cooling Systems
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Passive solar heating, cooling, and natural daylighting for a fire station in Springfield, Oregon, 8:33516 (J:US)
Visitor center at the Antelope Valley California Poppy Reserve, Lancaster, California, 8:33518 (J:US)
Passive Solar Heating Systems
Passive solar commercial building: new applications of an old technology leads to architectural innovations, 8:33515 (J:US)
Passive solar heating, cooling, and natural daylighting for a fire station in Springfield, Oregon, 8:33516 (J:US)

PUBLIC UTILITY REGULATORY POLICIES ACT
Effect of PURPA on OTEC economics, 8:33302 (RA:US)

PULMONARY CANCER
See CARCINOMAS

PULMONARY LAVAGE
See LUNGS

PULPS
See SLURRIES

PULSE COLUMNS
See EXTRACTION COLUMNS

PULSE GENERATORS
Design
Projectile-power-compressed magnetic-field pulse generator, 8:34950 (R:US)
Electronic Circuits
Circuit model for the explosive-driven plate generator, 8:34928 (R:US)

PULVERIZED FUEL ASH
See FLY ASH

PUMPS
Performance Testing
Tank 16 demonstration: multipump test results, 8:33211 (R:US)
Tank 16 demonstration: single-pump test results, 8:33210 (R:US)
Test Facilities
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)

PUREX PROCESS
Reagents
Testing and economical evaluation of U(IV) in Purex, 8:33183 (R:US)

PURPA
See PUBLIC UTILITY REGULATORY POLICIES ACT

PWR TYPE REACTORS
See also ANGRA-1 REACTOR
BIBLIS-3 REACTOR
CATAWBA-1 REACTOR
CATAWBA-2 REACTOR
OBRIGHEIM REACTOR
RANCHO SECO-1 REACTOR
SALEM-1 REACTOR
SEABROOK-1 REACTOR
SEABROOK-2 REACTOR
THREE MILE ISLAND-1 REACTOR
THREE MILE ISLAND-2 REACTOR
WWER TYPE REACTORS
WYHL-1 REACTOR
Containment Shells
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
Containment Systems
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)
Control Rooms
Near-term improvements for nuclear power plant control room annunciator systems, 8:33730 (R:US)
District Heating
Application of an intermediate LWR for electricity production and hot-water district heating, 8:33709 (R:US)
Engineered Safety Systems
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R:US)
Flow Models
Drift-flux model flow-regime map of two-phase flows for COTHA, 8:33674 (RA:IL)
Fuel Assemblies
Thermal reactor analysis for PWR fuel assemblies containing control rods, 8:33671 (RA:IL)
Fuel Element Clusters
Freon Rig design for performing heat transfer experiments for nuclear reactors fuel bundles, 8:33670 (RA:BR:In Portuguese)
Fuel Management
Proposed fuel management scheme for once-through PWR with 20% enrichment, 8:33672 (RA:IL)
Legal Aspects
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R:US)
Loss of Coolant
Nuclear class 1 piping stress analysis (TRHEAT Code; NUPIPE Code), 8:33746 (RA:BR:In Portuguese)
Meltdown
A probabilistic analysis of LWR steam explosions, 8:33771 (BA:US)
Pipes
Nuclear class 1 piping stress analysis (TRHEAT Code; NUPIPE Code), 8:33746 (RA:BR:In Portuguese)
Plutonium Recycle
Demonstration program in recycling of plutonium on the Obrigheim nuclear power plant, 8:33666 (R:DE:In German)
Improvement of reactor physics design methods for plutonium recycling in pressurized water reactors, 8:33702 (R:DE:In German)
Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R:DE:In German)
Power Supplies
Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R:US)
Pressure Vessels
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface, 8:33765 (R:US)
Underclad cracking in PWR reactor vessels, 8:33681 (TG:GB)
Primary Coolant Circuits
Design of a pressurized water loop heated by electric resistances, 8:33669 (RA:BR:In Portuguese)
Reactor Accidents
Hydrodynamics of adiabatic inverted annular flow: an experimental study, 8:33738 (R:US)
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface, 8:33765 (R:US)

Nuclear reactor safety in the USA, 8:33749 (R:US)
Reactor Cores
Effect of asymmetric phenomena on core burn-up and power distribution, 8:33673 (RA:IL)
Reactor Materials
Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R:US)
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Reactor Protection Systems
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R:US)
Reactor Safety
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Nuclear reactor safety in the USA, 8:33749 (R:US)
Nuclear reactor safety. Progress report, July 1-October 31, 1982 (Los Alamos National Laboratory), 8:33759 (R:US)
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R:US)
Station Blackout accident analyses (Part of NRC Task Action Plan A-44), 8:33767 (R:US)
Risk Assessment
Nuclear reactor safety in the USA, 8:33749 (R:US)
Spent Fuel Elements
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R:US)
Transients
Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982, 8:33742 (R:US)
Two-Phase Flow
Drift-flux model flow-regime map of two-phase flows for COTHA, 8:33674 (RA:IL)

PYRENE
Absorption Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)
Photoionization
Laser two-photon ionization spectroscopy of molecules in liquids, 8:34191 (J:NL)
Ultraviolet Spectra
Vacuum ultraviolet absorption spectra of aromatic molecules in solution, 8:34150 (J:US)

PYRIDINE
Liquid Column Chromatography
Comments on column characterization: a sulfur column, 8:34069 (J:DE)

PYRIDINES
See also BIPYRIDINES
PYRIDINE
PYRIDOXINE
Chemical Preparation
Synthesis of three [(trifluoroethyl)amino]pyridines, 8:34166 (J:US)
Chemical Reaction Yield
Synthesis of three [(trifluoroethyl)amino]pyridines, 8:34166 (J:US)

PYRIDOXINE
Biological Effects
Effect of a B-vitamin on tryptophan metabolism in South African Bantu with pellagra, 8:34511 (R:US)

PYROLYTIC GASES
Combustion
Semi-automatic wood gasifier coupled with an adjunct oil-fired boiler/burner unit, 8:33321 (R:US)

Q

QUAD CITIES-1 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R:US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R:US)

QUAD CITIES-2 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R:US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Quad Cities Nuclear Power Station, Units 1 and 2, Docket Nos. 50-254, 50-265, 8:33768 (R:US)

QUADRUPOLE LINACS
Alignment
Beam dynamics and vane geometry in the LBL Heavy-Ion RFQ, 8:34287 (R:US)
Electric Fields
Improved field stability in RFQ structures with vane-coupling rings, 8:34286 (R:US)
Electrodes
Beam dynamics and vane geometry in the LBL Heavy-Ion RFQ, 8:34287 (R:US)
Specifications
Mechanical design of a heavy-ion RFQ, 8:34271 (R:US)

QUANTUM CHROMODYNAMICS
Quantum chromodynamics and hadronic interactions at short distances, 8:34788 (R:US)
Pair Production
Probes of initial-state interactions in dilepton angular distributions, 8:34745 (R:US)
Reviews
Topological aspects in field theory and confinement, 8:34780 (RA:BR)
Topology
Topological aspects in field theory and confinement, 8:34780 (RA:BR)

QUANTUM ELECTRODYNAMICS
Infrared Divergences
Role of infrared phase factors in quantum electrodynamics, 8:34787 (R:JP)

QUANTUM ELECTRONICS
Computer Calculations
Supercomputer requirements for theoretical chemistry, 8:34168 (J:US)

QUANTUM FIELD THEORY
See also LAGRANGIAN FIELD THEORY
QUANTUM CHROMODYNAMICS
QUANTUM ELECTRODYNAMICS
QUANTUM FLAVORDYNAMICS
QUANTUM GRAVITY
Duality
Montonen-Olive conjecture, 8:34771 (R:XA)
Meetings
Proceedings of the international seminar on high energy physics and quantum field theory. Vol. 1, 8:34743 (R:SU)

Solitons
Geon-type solutions of the non-linear Heisenberg-Klein-Gordon equation, 8:34768 (R:XA)
Superselection Rules
Commutativity of charge superselection rules in standard quantum field theory, 8:34772 (R:XA)
Vacuum States
Quantum effective potential in $S^1 x R^3$, 8:34773 (R:XA)
QUANTUM FLAVORDYNAMICS
Detecting heavy flavors at CBA, 8:34747 (R:US)
QUANTUM GRAVITY
Matrix Elements
Recursive formula for the evaluation of <psi'T-circumflexsub(μnu)(x)'psi> and its application in the semi-classical theory of gravity, 8:34875 (R:XA)
QUANTUM MECHANICS
Computer Calculations
Supercomputer requirements for theoretical chemistry, 8:34168 (J:US)
Measure Theory
Limitations of quantum measurements I: Determination of the minimal amount of non-ideality and identification of the optimal measuring apparatuses, 8:34869 (R:XA)
Quantum limitations for spin measurements on systems of arbitrary spin, 8:34872 (R:XA)
QUARKONIUM
A hypothetical bound state of quark and antiquark.
See also CHARMONIUM
Potentials
Topics in quarkonium physics, 8:34758 (R:US)
Quantum Mechanics
Topics in quarkonium physics, 8:34758 (R:US)
QUARKS
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
Confinement
Topological aspects in field theory and confinement, 8:34780 (RA:BR)
Diffraction Models
Detecting heavy flavors at CBA, 8:34747 (R:US)
Fragmentation
Quark fragmentation and the determination of α/sub s/, 8:34756 (R:US)
Semileptonic Decay
Detecting heavy flavors at CBA, 8:34747 (R:US)
QUASARS
Mathematical Models
Origin of relativistic particles and gamma-rays in quasars, 8:34686 (R:US)
QUASI PARTICLES
Bose-Einstein Statistics
Calculation of low-frequency asymptotics for Green functions of degenerate Bose-systems (kinetic approximation), 8:34762 (RA:SU:In Russian)
Energy Spectra
Calculation of low-frequency asymptotics for Green functions of degenerate Bose-systems (kinetic approximation), 8:34762 (RA:SU:In Russian)
QUASI-FISSION
Quasi-fission, 8:34835 (R:US)
QUERCETIN
Absorption Spectroscopy
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Luminescence
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)
Ultraviolet Spectra
Excited state proton-transfer spectroscopy of 3-hydroxyflavone and quercetin, 8:34172 (J:US)

R

R REACTOR
Electrical Equipment
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactor Fueling
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Instrumentation
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
Reactivity monitoring during reactor-reloading operations, 8:33736 (R:US)
Reactor Maintenance
Nuclear instrumentation maintenance: Savannah River reactors, 8:33737 (R:US)
RADAR
Meteorology
Radar meteorology in cloud physics and radio wave propagation research, 8:34394 (R:DE:In German)
RADIATION ACCIDENTS
Biological Effects
Effects of the accident at Three Mile Island on the mental health and behavioral responses of the general population and nuclear workers, 8:33750 (R:US)
Environmental Impacts
Forecasting consequences of accidental release: how reliable are current assessment models, 8:33739 (R:US)
Mathematical Models
Critical review of the reactor-safety study radiological health effects model. Final report, 8:33766 (R:US)
Forecasting consequences of accidental release: how reliable are current assessment models, 8:33739 (R:US)
Radiation Doses
Interactive Rapid Dose Assessment Model (IRDAM): reactor-accident assessment methods. Vol.2, 8:33762 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): scenarios for comparing dose-assessment models. Vol.3, 8:33763 (R:US)
Interactive Rapid Dose Assessment Model (IRDAM): user's guide, 8:33761 (R:US)
RADIATION CHEMISTRY
Principles and techniques of radiation chemistry, 8:34200 (J:US)
RADIATION DAMAGE (BIOLOGICAL)
See RADIATION INJURIES
RADIATION DETECTION AND RANGE
See RADAR
RADIATION DETECTORS
See also CRYSTAL COUNTERS
DIELECTRIC TRACK DETECTORS
GRAVITATIONAL WAVE DETECTORS
IONIZATION CHAMBERS
LOW LEVEL COUNTERS
POSITION SENSITIVE DETECTORS
PROPORTIONAL COUNTERS
SEMICONDUCTOR DETECTORS
SHOWER COUNTERS
Efficiency
About the efficiency of a detector and the escape probability function, 8:34355 (RA:IL)
Escape Peaks
About the efficiency of a detector and the escape probability function, 8:34355 (RA:IL)
Semiconductor Devices
Semiconductor devices as track detectors in high energy colliding beam experiments, 8:34323 (J:US)
RADIATION DOSEMETERS
See DOSEMETERS
RADIATION HAZARDS
Risk Assessment
Role of environment, 8:34424 (R:US)
RADIATION HEATING
Gamma-ray heating in the Fast Breeder Blanket Facility, 8:33690 (J:US)

RADIATION HYGIENE
See RADIATION PROTECTION
RADIATION INJURIES
Biological Repair
Excision repair of DNA damage. I. Enzymology and mechanisms of excision repair. Oncology overview, 8:34602 (R:US)
RADIATION PROTECTION
Manuals
Ionizing radiation lab. Manual (584), 8:34604 (R:US)
Regulations
Guide for compliance with television receiver reporting and testing program requirements (21 CFR 1002.10 and 1002.12) - revision. Report for Mar 77-Aug 82, 8:34860 (R:US)
RADIATION SAFETY
See RADIATION PROTECTION
RADICALS
Not to be used for compound descriptions.
See also ALKYL RADICALS
CARBENES
HYDROXYL RADICALS
PEROXY RADICALS
SUPEROXIDE RADICALS
Absorption Spectra
Resonance Raman of viologen radicals, 8:34199 (J:NL)
G Value
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)
Polymerization
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
Raman Spectra
Resonance Raman of viologen radicals, 8:34199 (J:NL)
Structural Chemical Analysis
Study of radical reaction kinetics by time-resolved ESR, 8:34196 (BA:GB)
RADIOACTIVE AEROSOLS
Inhalation
DACRIN: a computer program for calculating organ dose from acute or chronic radionuclide inhalation, 8:34601 (R:US)
RADIOACTIVE BIOLOGICAL WASTES
See RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS
Radionuclide Migration
Comparison of simulated to actual plutonium deposition at the Savannah River Plant, 8:34414 (R:US)
Stack Disposal
Evaluation of the Split-H approach to modeling non-buoyant releases from vent stacks, 8:34415 (R:US)
RADIOACTIVE GASEOUS WASTES
See GASEOUS WASTES
RADIOACTIVE WASTES
RADIOACTIVE MATERIALS
See also RADIOACTIVE WASTES
Ion Beams
Negative ion beams of rare and radioactive isotopes, 8:34346 (BA:US)
Packaging
Quality assurance in packaging design through the peer review process, 8:34224 (R:US)
Physical Protection
Physical protection of nuclear-facilities and materials, 8:33257 (B:BR:In Portuguese)
RADIOACTIVE PARTICULATES
See PARTICLES
RADIOACTIVE AEROSOLS
RADIOACTIVE TRACERS
See RADIOPHARMACEUTICALS
RADIOACTIVE WASTE DISPOSAL
Alpha-Bearing Wastes
Long-term stability of alpha-recoil damage in monazite, 8:33218 (RA:IL)
Backfilling
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Bibliographies
Radioactive waste processing and disposal: a bibliography, 8:33201 (R:US)
Carbon 14
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Configuration
Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt, 8:33231 (R:NL)
Economics
RECON: a computer program for analyzing repository economics. Documentation and user's manual, 8:33188 (R:US)
Environmental Impacts
Alternatives for defense waste-salt disposal, 8:33206 (R:US)
Environmental impacts program, 8:33066 (RA:US)
Gaseous Wastes
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Geologic Deposits
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R:US)
Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R:US)
Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA:US)
Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA:US)
High-Level Radioactive Wastes
Management of high-level waste repository siting, 8:33235 (J:US)
Radioactive waste disposal options for the operation of nuclear power stations, 8:33216 (RA:IL)
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R:US)
Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R:US)
Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1, 8:33221 (R:US)
Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA:US)
Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA:US)
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA:US)
Hydraulic Fracturing
Characterization of hydrofracture grouts for radionuclide migration, 8:33196 (R:US)
Iodine 129
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Krypton 85
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Low-Level Radioactive Wastes
Decontaminated salt disposal as saltcrete in a landfill. Technical data summary, 8:33214 (R:US)
Radioactive waste disposal options for the operation of nuclear power stations, 8:33216 (RA:IL)
Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site, 8:33244 (R:US)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)

Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982, 8:33199 (R:US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982, 8:33198 (R:US)
Marine Disposal
Ocean disposal of radioactive wastes, 8:33236 (J:US)
Materials Testing
MCC stress-corrosion-cracking rate tension test method (MCC-104S), 8:33967 (R:US)
Planning
Underground storage of radioactive waste in rock salt: organization of the work concerning the underground storage of radioactive waste, 8:33230 (R:NL)
Radiation Hazards
Calculation of health effects per curie release for comparison with the EPA standard, 8:33250 (RA:US)
Health effects associated with unit radonuclide releases to the environment, 8:33249 (RA:US)
Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6, 8:33248 (R:US)
Radionuclide Migration
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Leaching behavior of monazite, 8:33217 (RA:IL)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Technical assistance for regulatory development: review and evaluation of the draft EPA standard 40CFR191 for disposal of high-level waste. Volumes 5 and 6, 8:33248 (R:US)
Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA:US)
Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA:US)
Regulations
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R:US)
Risk Assessment
Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1, 8:33221 (R:US)
Salt Deposits
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R:US)
Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations, 8:33229 (R:NL)
Underground storage of radioactive waste in rock salt: organization of the work concerning the underground storage of radioactive waste, 8:33230 (R:NL)
Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt, 8:33231 (R:NL)
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA:US)
Site Selection
Management of high-level waste repository siting, 8:33235 (J:US)
Waste isolation program, 8:33227 (RA:US)
Solid Wastes
Alternatives for defense waste-salt disposal, 8:33206 (R:US)
Standards
Technical assistance for regulatory development: review and evaluation of the EPA standard 40 CFR191 for disposal of high-level waste. Vol. 1, 8:33221 (R:US)
Tritium
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Underground Disposal
Alternatives for defense waste-salt disposal, 8:33206 (R:US)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Trench moisture-barrier technology. Fourth quarterly report, July 1-September 30, 1982, 8:33199 (R:US)
Trench moisture-barrier technology. Third quarterly report, April 1-June 30, 1982, 8:33198 (R:US)

RADIOACTIVE WASTE FACILITIES
Compliance
Technical assistance for regulatory development: review and evaluation of the draft EPA Standard 40CFR191 for disposal of high-level waste, 8:33252 (R:US)
Volume 2. A simplified analysis of a hypothetical repository in a basalt formation, 8:33253 (RA:US)
Volume 3. A simplified analysis of a hypothetical repository in a tuff formation, 8:33254 (RA:US)
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA:US)
Design
Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R:US)
Economics
RECON: a computer program for analyzing repository economics. Documentation and user's manual, 8:33188 (R:US)
Performance
FFSM: Far-Field State Model. Technical report, 8:33224 (R:US)
PHREEQE: a geochemical speciation and mass-transfer code suitable for nuclear waste performance assessment, 8:34676 (R:US)
Technical conservatism in the design and analysis of a nuclear-waste repository in basalt, 8:33233 (R:US)
Workshop on uncertainty analysis of postclosure nuclear waste isolation system performance, 8:33223 (R:US)
Process Control
DWPF process control, 8:33204 (R:US)
Radionuclide Migration
Volume 4. A simplified analysis of a hypothetical repository in a bedded salt formation, 8:33255 (RA:US)
Safety
Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report, 8:33246 (R:US)
Site Selection
Management of high-level waste repository siting, 8:33235 (J:US)

RADIOACTIVE WASTE MANAGEMENT
Alpha-Bearing Wastes
Management of plutonium contaminated waste, 8:33237 (B:US)
High-Level Radioactive Wastes
Considerations on the management of wastes expected to be generated by the operation of Brazilian nuclear reactors, 8:33215 (RA:BR:In Portuguese)
Management of high-level waste repository siting, 8:33235 (J:US)
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
Low-Level Radioactive Wastes
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Technology Assessment
Department of Energy Low-Level Waste Management Program, 8:33226 (RA:US)

RADIOACTIVE WASTE PROCESSING
Alpha-Bearing Wastes
Management of plutonium contaminated waste, 8:33237 (B:US)
Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report, 8:33246 (R:US)
Bibliographies
Radioactive waste processing and disposal: a bibliography, 8:33201 (R:US)
Cesium
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)

Combustion
Transuranic-contaminated solid waste Treatment Development Facility. Final safety analysis report, 8:33246 (R:US)
High-Level Radioactive Wastes
DWPF process control, 8:33204 (R:US)
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
Ion Exchange
New trends in development of instrumentation for ion exchange purification of radioactive liquid wastes, 8:33220 (RA:CS:In Czech)
Liquid Wastes
New trends in development of instrumentation for ion exchange purification of radioactive liquid wastes, 8:33220 (RA:CS:In Czech)
Low-Level Radioactive Wastes
Decontaminated salt disposal as saltcrete in a landfill. Technical data summary, 8:33214 (R:US)
On-Line Measurement Systems
Development of on-line monitoring device to detect the presence/absence of sodium vapor, 8:33191 (R:US)
Plutonium
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
Solidification
Decontaminated salt disposal as saltcrete in a landfill. Technical data summary, 8:33214 (R:US)
DWPF process control, 8:33204 (R:US)
Strontium
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
Technology Assessment
Investigations on the assessment and optimization of solidifying weakly radioactive to medium radioactive wastes with hydraulic binders for a new storage technique in salt formations, 8:34472 (R:DE:In German)

RADIOACTIVE WASTE STORAGE
High-Level Radioactive Wastes
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Leaks
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Tanks
Removal of sludge from waste tanks, 8:33212 (R:US)
Tank 16 demonstration: single-pump test results, 8:33210 (R:US)

RADIOACTIVE WASTES
See also ALPHA-BEARING WASTES
HIGH-LEVEL RADIOACTIVE WASTES
INTERMEDIATE-LEVEL RADIOACTIVE WASTES
LOW-LEVEL RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS
Leaching
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Radiation Monitoring
Passive neutron waste monitoring system, 8:34364 (RA:IL)

RADIOBIOLOGICAL EFFECTS
See BIOLOGICAL RADIATION EFFECTS

RADIODIAGNOSIS (RADIONUCLIDES)
See NUCLEAR MEDICINE

RADIOECOLOGY
Role of environment, 8:34424 (R:US)

RADIOISOTOPE BATTERIES
Specifications
Nuclear energy in space, 8:33693 (TJ:US)

RADIOISOTOPE MIGRATION
See RADIONUCLIDE MIGRATION

RADIOISOTOPE-LABELLED DRUGS
See RADIOPHARMACEUTICALS

RADIOISOTOPES
Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report, 8:34455 (R:US)
Lifetime
Statistically optimal evaluation of decay constant using the data of measurements with low background noise, 8:34539 (RA:SU:In Russian)

RADIOLOGICAL PERSONNEL
Education
Ionizing radiation lab. Manual (584), 8:34604 (R:US)

RADIOLOGICAL PROTECTION
See RADIATION PROTECTION

RADIONUCLIDE MIGRATION
In environment.
Computer Codes
Radionuclide transport code development in support of nuclear waste storage investigations, 8:33245 (R:US)
Mathematical Models
Role of environment, 8:34424 (R:US)
Soil and vegetation, 8:34429 (RA:US)

RADIONUCLIDE TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION

RADIONUCLIDES
See RADIOISOTOPES

RADIOPHARMACEUTICALS
Chemical Preparation
New blood flow radiopharmaceutical, 8:34545 (RA:US)
Radionuclide generators and cyclotron produced positron emitters for synthesis of biochemical substrates, 8:34544 (RA:US)
XVIIIth nuclear medicine days. Abstracts of papers, 8:34513 (R:CS:In Czech and Slovak)
Diagnostic Uses
XVIIIth nuclear medicine days. Abstracts of papers, 8:34513 (R:CS:In Czech and Slovak)
Isotope Applications
Perfusion measurements with radioactively labelled microspheres. Technique and computer-based evaluation, 8:34527 (R:DE:In German)

RADIOPROTECTIVE SUBSTANCES
Chemical Preparation
Synthesis of new prophylactic antiradiation drugs. Progress report No. 1, 1 Mar-31 Jul 80, 8:34571 (R:US)

RADIOSURGERY
See RADIOTHERAPY

RADIOTHERAPY
Bibliographies
Treatment of bladder cancer. Oncology overview, 8:34553 (R:US)
Heavy Ion Accelerators
Design of a dedicated heavy ion accelerator for radiotherapy, 8:34317 (R:US)
High-performance control system for a heavy-ion medical accelerator, 8:34318 (R:US)
Planning
Heavy-ion radiography, 8:34550 (RA:US)

RADISHES
Ultrastructural Changes
Effect of enhanced UV-B radiation on leaf surface and anatomy, 8:34649 (RA:DE)
Ultraviolet Radiation
Effect of enhanced UV-B radiation on development and composition of plants, 8:34648 (RA:DE)
Effect of enhanced UV-B radiation on leaf surface and anatomy, 8:34649 (RA:DE)
Effects of UV B radiation on composition of two crop species during mild water stress, 8:34658 (RA:DE)
Effects of UV-B irradiation on leaf resistances in two crop species during mild water stress, 8:34659 (RA:DE)

RADIUM 226
Radiation Monitoring
Monitoring of deactivation stations in nuclear power plants, 8:34376 (RA:CS:In Czech)
RADON
Diffusion
Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R:US)
Distribution Functions
Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R:US)
Radiation Monitoring
Radon release from building material, 8:34416 (R:SE)
Radioecological Concentration
Radon in homes and other technologically enhanced radioactivity, 8:34412 (R:US)
Ventilation
Small houses in rocks. Preliminary study, 8:33896 (R:SE:In Swedish)
RAFT RIVER VALLEY
Geothermal Power Plants
Field tests of a vertical-fluted-tube condenser in the prototype power plant at the Raft River Geothermal Test Site, 8:33565 (R:US)
RAMAN SPECTRA
Line Broadening
Picosecond studies of vibrational linewidth broadening in liquids, 8:34091 (R:US)
RANCHO SECO-1 REACTOR
Auxiliary Systems
Review of the Rancho Seco Nuclear Generating Station Unit No. 1 auxiliary feedwater-system reliability analysis, 8:33764 (R:US)
RANGELANDS
Production
Impacts of technology on US cropland and rangeland productivity, 8:34475 (R:US)
RAPID TRANSIT SYSTEMS
Energy Conservation
Between riding and flying, 8:33927 (R:DE)
Levitated Trains
Between riding and flying, 8:33927 (R:DE)
Trains
Between riding and flying, 8:33927 (R:DE)
RARE EARTH COMPOUNDS
See also EUROPIUM COMPOUNDS
MONAZITES
SAMARIUM COMPOUNDS
YTTERBIUM COMPOUNDS
Absorption Spectra
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
Electrochemistry
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
RARE EARTH NUCLEI
For nuclear properties of rare earths.
See also CERIUM 144
ERBIUM 167
EUROPIUM 151
GADOLINIUM 149
HOLMIUM 154
LANTHANUM 138
PRASEODYMIUM 144
THULIUM 169
High Spin States
Transition from collective to noncollective rotation at high spin in N ≈ 87 nuclei, 8:34831 (R:US)
RARE GASES
See also ARGON
HELIUM
KRYPTON
NEON
RADON
XENON
Adsorption
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
Photoemission
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
RAYLEIGH SCATTERING
Series Expansion
Series expansion methods for extracting ternary diffusion coefficients from Rayleigh interferometric data, 8:34138 (J:US)
RDF
See REFUSE DERIVED FUELS
REACTOR ACCIDENTS
See also LOSS OF COOLANT
MELTDOWN
REACTOR CORE DISRUPTION
Civil Liability
Aspects of the Brazilian law on civil liability for nuclear damage, 8:33777 (B:BR:In Portuguese)
Heat Transfer
Hydrodynamics of adiabatic inverted annular flow: an experimental study (PWR; BWR), 8:33738 (R:US)
Hydraulics
Hydrodynamics of adiabatic inverted annular flow: an experimental study (PWR; BWR), 8:33738 (R:US)
Hydrodynamics
Hydrodynamics of adiabatic inverted annular flow: an experimental study (PWR; BWR), 8:33738 (R:US)
Thermal Stresses
Modification of OCA-I for application to a reactor pressure vessel with cladding on the inner surface (PWR), 8:33765 (R:US)
REACTOR COMPONENTS
See also BREEDING BLANKETS
FUEL ELEMENTS
REACTOR CORES
Fluid-Structure Interactions
Measurement of crossflow forces on tubes, 8:33724 (R:US)
Reliability
In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R:US)
Seismic Effects
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R:US)
Turbulent Flow
Measurement of crossflow forces on tubes, 8:33724 (R:US)
REACTOR CONTROL SYSTEMS
Technology Assessment
Hierarchically structured identification and classification method for vibration control of reactor components, 8:34465 (R:DE:In German)
REACTOR CORE DISRUPTION
Energy Yield
Fission gas effects in fast reactor disassembly, 8:33776 (B:GB)
Heat Transfer
Theory and application of a three-dimensional code SHAPS to complex piping systems (LMFBR), 8:33740 (R:US)
Hydraulics
Theory and application of a three-dimensional code SHAPS to complex piping systems (LMFBR), 8:33740 (R:US)
REACTOR CORES
Asymmetry
Effect of asymmetric phenomena on core burn-up and power distribution, 8:33673 (RA:IL)
Burnup
Effect of asymmetric phenomena on core burn-up and power distribution, 8:33673 (RA:IL)
Cross Sections
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
Doppler Coefficient
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
Multiplication Factors
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)

Power Distribution
Effect of asymmetric phenomena on core burn-up and power distribution, 8:33673 (RA:IL)
Reaction Kinetics
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
Reactivity Worths
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
Void Coefficient
Benchmark tests of Japanese Evaluated Nuclear Data Library (JENDL), 8:33691 (J:US)
REACTOR FUEL ELEMENTS
See FUEL ELEMENTS
REACTOR FUELS
See NUCLEAR FUELS
REACTOR LATTICE PARAMETERS
Computer Calculations
Comparison calculations with various versions of the LEOPARD codes, 8:33716 (RA:IL)
REACTOR LATTICE PITCH
See REACTOR LATTICE PARAMETERS
REACTOR LATTICES
Resonance Absorption
Tight-lattice resonance absorption by cylinderization of extended cells, 8:33719 (RA:IL)
REACTOR MATERIALS
To be assigned in conjunction with the specific descriptor for the material used in a reactor, provided this descriptor is not yet up-posted to reactor materials.
See also NUCLEAR FUELS
Fatigue
Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R:US)
Fracture Properties
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1 (PWR;BWR), 8:33665 (R:US)
Physical Radiation Effects
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1 (PWR;BWR), 8:33665 (R:US)
REACTOR OPERATORS
Education
Qualification of reactor operators, 8:33704 (RA:BR:In Portuguese)
Training
Qualification of reactor operators, 8:33704 (RA:BR:In Portuguese)
REACTOR PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text book, etc.
Applied uses of nuclear level densities, 8:34824 (R:US)
REACTOR SAFETY
Research Programs
EPRI joins reactor project, 8:33811 (J:US)
High-temperature gas-cooled-reactor safety studies for the Division of Accident Evaluation. Quarterly progress report, July 1-September 30, 1982. Volume 3, 8:33760 (R:US)
Nuclear reactor safety. Progress report, July 1-October 31, 1982 (Los Alamos National Laboratory), 8:33759 (R:US)
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Risk Assessment
EPRI joins reactor project, 8:33811 (J:US)
REACTOR VESSELS
For nonpressurized containers of reactor cores and associated components.
Seismic Effects
Seismic response of large suspended tanks (LMFBR), 8:33741 (R:US)
RECEPTORS
Spatial Distribution
Use of low density lipoprotein (LDL) colloidal gold complexes to study the distribution of low density lipoproteins on cell surfaces, 8:34481 (RA:US)
RECLAMATION
See LAND RECLAMATION
RECYCLE (FUEL)
See FUEL CYCLE
REFRACTORIES
Comparative Evaluations
Evaluation of glass-contact materials for waste glass melters (Corhart 1215, Corhart 1780, ER-2161), 8:33207 (R:US)
Corrosion Resistance
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)
Wear
Wear of refractories in slagging gasifiers, 8:34004 (BA:US)
REFRIGERATORS
See also MAGNETIC REFRIGERATORS
SOLAR REFRIGERATORS
Waste Heat Utilization
Heating of domestic water by waste heat recovery from household refrigerating equipment, 8:33887 (R:DE:In German)
REFUSE
See SOLID WASTES
REFUSE DERIVED FUELS
Air Pollution
Experimental firing with Brini, at Ekajoe, April 1981, 8:33278 (R:SE)
Combustion Properties
Experimental firing with Brini, at Ekajoe, April 1981, 8:33278 (R:SE)
REGION V
See FEDERAL REGION V
REGION VII
See FEDERAL REGION VII
REGOLITH
See OVERBURDEN
REGRESSION ANALYSIS
Iterative Methods
Projection pursuit regression, 8:34972 (J:US)
REINDEER
See DEER
REINFORCED MATERIALS
See also REINFORCED PLASTICS
Strains
Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet, 8:33606 (R:SE)
Testing
Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet, 8:33606 (R:SE)
REINFORCED PLASTICS
Corrosion Resistance
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
Fire Resistance
Fiberglass reinforced plastics and their successful use in flue gas desulfurization equipment, 8:33026 (RA:US)
RELEASE (FISSION PRODUCT)
See FISSION PRODUCT RELEASE
RELIABILITY
Data Base Management
In-plant reliability data system (IPRDS) - a utility-oriented data base, 8:33662 (R:US)
REMOTE HANDLING EQUIPMENT
Design
Design of a redundant-load-path lifting fixture for the Clinch River Breeder Reactor Plant spent-fuel shipping cask, 8:34222 (R:US)
RENE 41
Erosion
Erosion behavior of materials in multiphase flows, 8:33980 (BA:US)
RENEWABLE ENERGY SOURCES
See also BIOMASS
GEOTHERMAL ENERGY
HYDROELECTRIC POWER
SOLAR ENERGY
WAVE POWER
WIND POWER

Energy Source Development
Renewable energy resources in the developing countries, 8:33873 (RA:US)
Market
Some economic aspects of the penetration potential of advanced transformation processes for non-agricultural renewable energy, 8:33875 (RA:DE)
Meetings
United Nations conference on new and renewable sources of energy, 8:33871 (RA:US)
US plans for the United Nations conference on new and renewable sources of energy, 8:33872 (RA:US)

REPAIR (BIOLOGICAL)
See BIOLOGICAL REPAIR

REPUBLIC OF KOREA
Economic Development
Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea, 8:33797 (R:DE)
Standard of Living
Quantifying the effects of higher world oil prices on resource allocation and living standards in an energy poor open economy: the case of Korea, 8:33797 (R:DE)

RESEARCH PROGRAMS
To be used jointly with descriptor(s) for subject field and/or organization concerned.
Comparative Evaluations
How power options stack up, 8:33812 (J:US)
Planning
Guide to programs, fiscal year 1983, 8:33809 (R:US)

RESERVOIR ROCK
Permeability
Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA:US)
Plugging
Plugging and penetration of petroleum reservoir rock by microorganisms, 8:33113 (RA:US)

RESID
See PETROLEUM RESIDUES

RESIDENCES
See HOUSES

RESIDENTIAL BUILDINGS
See also APARTMENT BUILDINGS
HOUSES
Computer Codes
M.E.P.A.: micro-computer erergy programs for architects, 8:33454 (J:US)
Energy Audits
Model energy audit procedure for the RCS program, 8:34460 (BA:US)
Energy Conservation
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
Energy Consumption
Impact of conservation measures on Pacific Northwest residential energy consumption. Final report, 8:33902 (R:US)
M.E.P.A.: micro-computer erergy programs for architects, 8:33454 (J:US)
Heat Pumps
Absorption heat pump for heating small residential buildings, 8:33888 (R:DE:In German)
Heating Load
F-load: a building heating load calculation program, 8:33452 (J:US)
Passive Solar Heating Systems
Joint optimization of solar and superinsulation in a cold climate, 8:33443 (J:US)
Low cost passive solar townhomes, 8:33492 (J:US)
New York State passive solar design and retrofit competition, 8:33527 (J:US)
Photovoltaic/passive solar residential systems, 8:33364 (J:US)
Photovoltaic Power Supplies
Photovoltaic/passive solar residential systems, 8:33364 (J:US)
Radon
Radon in homes and other technologically enhanced radioactivity, 8:34412 (R:US)
Solar Access
Ashland, Orgen's solar strategy, 8:33311 (J:US)
Solar Heating Systems
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
Thermal Insulation
Joint optimization of solar and superinsulation in a cold climate, 8:33443 (J:US)

RESIDUAL OILS
See PETROLEUM RESIDUES

RESIDUAL PETROLEUM
Measuring Methods
Fuel cycle programs. Quarterly progress report, July-September 1982, 8:33190 (R:US)
Fuel cycle programs. Quarterly progress report, April-June 1982 , 8:33189 (R:US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)

RESIDUES (MATHEMATICAL)
See SINGULARITY

RESIDUES (RADIOACTIVE)
See RADIOACTIVE WASTES

RESONANCE CAVITIES
See CAVITY RESONATORS

RESOURCE RECOVERY ACTS
Implementation
Regulation of solid wastes from coal-gasification and -liquefaction facilities: an analysis of Federal and selected state hazardous-waste management programs under RCRA, 8:33021 (R:US)

RESOURCE RECOVERY FACILITIES
Study of zones of vacuum influence surrounding landfill gas-extraction wells, 8:33939 (R:US)

RESPIRABLE DUSTS
See DUSTS

RESPIRATION
Physiology
Constant-flow ventilation of apneic dogs, 8:34569 (B:US)

RESPIRATORS
Design
Improved self-contained breathing apparatus concept. Final report Oct 80-Jun 82, 8:34666 (R:US)

RESPIRATORY EQUIPMENT
See RESPIRATORS

RESPIRATORY SYSTEM
See also LARYNX
LUNGS
Radiation Doses
DACRIN: a computer program for calculating organ dose from acute or chronic radionuclide inhalation, 8:34601 (R:US)

RESPIRATORY TRACT CELLS
Morphological Changes
Dark epithelial cells in preneoplastic lesions of the human respiratory tract, 8:34638 (J:US)
Oncogenic Transformations
Dark epithelial cells in preneoplastic lesions of the human respiratory tract, 8:34638 (J:US)

RETINA
Morphological Changes
Functional analysis of laser-induced ocular damage, 8:34665 (RA:US)

REVERSE COMBUSTION
Mathematical Models
Modeling studies of reverse combustion linking at high pressure, 8:32992 (RA:US)
Stability
Modeling studies of reverse combustion linking at high pressure, 8:32992 (RA:US)

REVERSE-FIELD PINCH
First Wall
Copper alloy irradiations studies in support of CRFPR first wall, 8:34930 (R:US)

RHODAMINES
Effect of organic adsorbates on the initial stage of electrolytic metal deposition: development and use of a spectroscopic ellipsometer, 8:33963 (R:US)

RHODE ISLAND
Heating Oils
Survey on prices, volumes, and inventory data for residential and rack No. 2 heating oil, October 1, 1982-May 31, 1983, 8:33854 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
RHODIUM COMPLEXES
Crystal Structure
Chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I). A square planar SO_2-transition metal complex, 8:34140 (J:CH)
Lattice Parameters
Chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I). A square planar SO_2-transition metal complex, 8:34140 (J:CH)
Molecular Structure
Chlorobis(tricyclohexylphosphine)(sulfur dioxide)rhodium(I). A square planar SO_2-transition metal complex, 8:34140 (J:CH)
RIBONUCLEASE
See RNA-ASE
RIBONUCLEIC ACID
See RNA
RICE
Ultraviolet Radiation
Field trials with soybeans, rice and wheat under UV-B irradiances simulating several O_3 depletion levels, 8:34647 (RA:DE)
RIDESHARING
See VANPOOLING
RIFT ZONES
Seismicity
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
Tectonics
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)
RINGS (STORAGE)
See STORAGE RINGS
RISER CRACKING
See COAL LIQUEFACTION
RISK ASSESSMENT
Bioassay
Carcinogenic potency, 8:34620 (RA:US)
Decision Making
The treatment of uncertainties in risk for regulatory decision making, 8:33819 (BA:US)
Mathematical Models
Radiation epidemiology, 8:34591 (RA:US)
Regulations
The treatment of uncertainties in risk for regulatory decision making, 8:33819 (BA:US)
RNA
Hydrolysis
Yeast endoribonuclease stimulated by Novikoff Hepatoma small nuclear RNAS U1 and U2, 8:34486 (J:US)
RNA POLYMERASE
See RNA
RNA-ASE
Code number 3.1.4.22 and 3.1.4.34.
Stimulation
Yeast endoribonuclease stimulated by Novikoff Hepatoma small nuclear RNAS U1 and U2, 8:34486 (J:US)
ROADS
Ground Motion
Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany, 8:33065 (R:DE:In German)
Radiation Monitoring
Radon release from building material, 8:34416 (R:SE)
ROADWAYS (MINES)
See MINE ROADWAYS
ROCK BEDS
Computerized Simulation
Parametric sunspace/rockbed studies using CALPAS3, 8:33426 (J:US)
Parametric Analysis
Parametric sunspace/rockbed studies using CALPAS3, 8:33426 (J:US)
ROCK MECHANICS
Relationship of rock physics to geothermal energy technology. Final report, February 1, 1981-January 31, 1982, 8:33569 (R:US)
Statistical characterization of complex crack and petrographic texture: application to predicting bulk physical properties, 8:33570 (RA:US)
ROCK SALT
See SALT DEPOSITS
ROCKS
See also IGNEOUS ROCKS
Chemical Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Cracks
Quantitative petrostructure analysis, 8:33571 (RA:US)
Mechanical Properties
Analytical and experimental studies on penetration into geological targets, 8:34225 (R:US)
Physical Properties
Statistical characterization of complex crack and petrographic texture: application to predicting bulk physical properties, 8:33570 (RA:US)
Thermal Conductivity
Methods for the determination of thermal properties of soils and rocks, 8:33568 (R:SE:In Swedish)
Thermal Diffusivity
Methods for the determination of thermal properties of soils and rocks, 8:33568 (R:SE:In Swedish)
ROMANIA
Oil Wells
Microbial enhancement of oil recovery in Romania, 8:33122 (RA:US)
ROTARY DRILLING
MWD Systems
Stress of the drilling shaft in deep-well drilling, 8:33134 (R:DE:In German)
ROTORS
See also DARRIEUS ROTORS
Performance Testing
Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems, 8:33611 (R:US)
ROUS SARCOMA VIRUS
See ONCOGENIC VIRUSES
RUBIDIUM
Polarization
Reliable static electric dipole polarizabilities for heavy elements, 8:34101 (J:NL)
RUMANIA
See ROMANIA
RUTHENIUM 106
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Environmental Exposure Pathway
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Environmental Transport
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)

RUTHENIUM COMPLEXES
Chemical Reaction Kinetics
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Crystal Structure
Synthesis and x-ray crystal structure of $[PPN]^+$ Z[R uIr$_4$(CO)$_8$(μ_4-CO)$_8$]$^{2-}$, 8:34135 (J:NL)
Electron Transfer
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Excitation
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Oxidation
Flash-photolysis studies of the electron-transfer reactions of dioxygen complexes of cobalt (III) with tris(2,2'-bipyridyl)ruthenium(III), 8:34146 (B:IN)
Photochemical Reactions
Photochemical energy conversion and solution kinetics, 8:34177 (R:US)
Reduction
Photochemical energy conversion and solution kinetics, 8:34177 (R:US)
Synthesis
Synthesis and x-ray crystal structure of $[PPN]^+{}_2$[R uIr$_4$(CO)$_8$(μ_4-CO)$_8$]$^{2-}$, 8:34135 (J:NL)
RWE-BAYERNWERK REACTOR
Plutonium Recycle
Improvement of plutonium recycling in boiling water reactors by irradiation experience and experiments, 8:33664 (R:DE:In German)

S

S PROCESS
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
Nuclear Reaction Kinetics
Capture cross sections of the neon isotopes and the s-process neutron balance, 8:34807 (R:DE)
SACCHAROMYCES CEREVISIAE
Gene Recombination
Comparative analysis of mitotic and meiotic recombination in Saccharomyces cerevisiae, 8:34504 (RA:US)
Genetic Mapping
Genetic map of the yeast Saccharomyces cerevisiae, 8:34503 (RA:US)
Isolation and characterization of yeast DNA repair genes, 8:34502 (RA:US)
Genetic Radiation Effects
Isolation and characterization of yeast DNA repair genes, 8:34502 (RA:US)
SAFETY
For general aspects of safety and protection of personnel.
See also REACTOR SAFETY
Monitors
Feasibility study of a sealed safety monitor for trucks carrying LNG and other hazardous materials, 8:33165 (R:US)
SAFETY (NUCLEAR)
See RADIATION PROTECTION
SAFETY (REACTOR)
See REACTOR SAFETY
SALEM NUCLEAR GENERATING STATION UNIT-1
See SALEM-1 REACTOR
SALEM-1 REACTOR
ATWS
Generic implications of ATWS events at the Salem Nuclear Power Plant: generic implications. Vol. 1, 8:33754 (R:US)
Reactor Instrumentation
Generic implications of ATWS events at the Salem Nuclear Power Plant: generic implications. Vol. 1, 8:33754 (R:US)
Reactor Protection Systems
Generic implications of ATWS events at the Salem Nuclear Power Plant: generic implications. Vol. 1, 8:33754 (R:US)
SALINE ZONE
See OIL SHALES
SALT DEPOSITS
Creep
Constitutive properties of salt from four sites (Richton dome; Mississippi; Vacherie dome; Louisiana; Permian basin, Texas; Paradox basin, Utah), 8:34670 (R:US)
Numerical studies of laboratory triaxial creep tests, 8:34673 (R:US)
Poisson Ratio
Constitutive properties of salt from four sites (Richton dome; Mississippi; Vacherie dome; Louisiana; Permian basin, Texas; Paradox basin, Utah), 8:34670 (R:US)
Rock Mechanics
Underground storage of radioactive waste in rock salt: temperature increase due to the storage of nuclear fission waste in rock salt, 8:33231 (R:NL)
Specific Heat
Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations, 8:33229 (R:NL)
Strains
Constitutive properties of salt from four sites (Richton dome; Mississippi; Vacherie dome; Louisiana; Permian basin, Texas; Paradox basin, Utah), 8:34670 (R:US)
Stresses
Constitutive properties of salt from four sites (Richton dome; Mississippi; Vacherie dome; Louisiana; Permian basin, Texas; Paradox basin, Utah), 8:34670 (R:US)
Thermal Conductivity
Underground storage of radioactive waste in rock salt: physical constants of rock salt and nuclear fission waste for the purpose of temperature calculations, 8:33229 (R:NL)
Young Modulus
Constitutive properties of salt from four sites (Richton dome; Mississippi; Vacherie dome; Louisiana; Permian basin, Texas; Paradox basin, Utah), 8:34670 (R:US)
SALTS
Use specific salts whenever possible
Corrosive Effects
Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R:SE:In Swedish)
SAMARIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
SAMARIUM COMPOUNDS
Absorption Spectra
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
Electrochemistry
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
SAMPLE HOLDERS
Design
Simple-design high vacuum infrared cell for in situ studies of supported metal catalysts, 8:34171 (J:US)
SANDIA LABORATORIES
Management
Report of the Energy Research Advisory Board on the relationship between the University of California and the Los Alamos Scientific and the Lawrence Livermore Laboratories, 8:34953 (R:US)
SANDSTONES
Permeability
Investigation of the transport of bacteria through porous media, 8:33110 (RA:US)
Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA:US)

Plugging
Transport phenomena and plugging in Berea sandstone using microorganisms, 8:33111 (RA:US)
SANITARY LANDFILLS
Design
Design and operation of a demonstration sanitary landfill developed to optimize the generation and capture of combustible gas, 8:33938 (R:US)
Gas Yields
Applications manual for analyzing landfill methane-recovery data using the Computer Analysis of Field Data (CAFD) interactive graphics system, 8:33940 (R:US)
Design and operation of a demonstration sanitary landfill developed to optimize the generation and capture of combustible gas, 8:33938 (R:US)
Study of zones of vacuum influence surrounding landfill gas-extraction wells, 8:33939 (R:US)
Operation
Design and operation of a demonstration sanitary landfill developed to optimize the generation and capture of combustible gas, 8:33938 (R:US)
SAUDI ARABIA
Soils
Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R:SE:In Swedish)
SAVANNAH RIVER PLANT
Computer Networks
Security and risk analysis at Savannah River, 8:34957 (R:US)
Environmental Policy
Environmental protection analysis and planning for proposed Savannah River Plant actions, 8:34440 (R:US)
Radioactive Waste Disposal
Alternatives for defense waste-salt disposal, 8:33206 (R:US)
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Radioactive Waste Facilities
DWPF process control, 8:33204 (R:US)
Radioactive Waste Management
Strategy document: long-term technology program for defense high-level waste, 8:33200 (R:US)
Radioactive Waste Processing
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
SAVANNAH RIVER PLANT K REACTOR
See K REACTOR
SAVANNAH RIVER PLANT P REACTOR
See P REACTOR
SAVANNAH RIVER PLANT R REACTOR
See R REACTOR
SAVANNAH RIVER PROCESS DEVELOPMENT REACTO
See PDP REACTOR
SCANDIUM 45 TARGET
Neutron Reactions
Total neutron cross section of ^{45}Sc at the 2 keV, 8:34817 (J:US)
SCATTERING
Three-Body Problem
Scattering matrix element of the three body reactive collision, 8:34868 (R:XA)
SCHMEHAUSEN THTR REACTOR
See THTR-300 REACTOR
SCHOOL BUILDINGS
Daylighting
Designs for a zero-energy elementary school in Oregon, 8:33519 (J:US)
Impact of consumer/client issues on passive solar design, 8:33474 (J:US)
Methane
Designs for a zero-energy elementary school in Oregon, 8:33519 (J:US)
Passive Solar Heating Systems
Impact of consumer/client issues on passive solar design, 8:33474 (J:US)
Photovoltaic Power Supplies
Designs for a zero-energy elementary school in Oregon, 8:33519 (J:US)
Water Walls
Designs for a zero-energy elementary school in Oregon, 8:33519 (J:US)
SCLERA
See EYES
SCRUBBERS
See also DRY SCRUBBERS
Performance Testing
Full-scale utility flue gas desulfurization system characterization results, 8:33034 (RA:US)
SEABROOK-1 REACTOR
Reactor Licensing
Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1, 8:33696 (R:US)
Reactor Safety
Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1, 8:33696 (R:US)
SEABROOK-2 REACTOR
Reactor Licensing
Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1, 8:33696 (R:US)
Reactor Safety
Safety evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444. Suppl. 1, 8:33696 (R:US)
SEALS
Leak Testing
Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:34223 (R:US)
SEAS
Natural Radioactivity
Ocean disposal of radioactive wastes, 8:33236 (J:US)
Radioactive Waste Disposal
Ocean disposal of radioactive wastes, 8:33236 (J:US)
SEAWATER
Sampling
Routine apparatus for marine ^{85}Kr-samples, 8:34468 (R:DE:In German)
SEBACEOUS GLANDS
See GLANDS
SKIN
SECONDARY BATTERIES
See ELECTRIC BATTERIES
SECONDARY COOLANT CIRCUITS
Corrosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
SECONDARY RECOVERY
See ENHANCED RECOVERY
SEED-SLAG INTERACTIONS
Mathematical Models
Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R:US)
Thermodynamic Activity
Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R:US)
SEISMIC EFFECTS
Standards
Towards a systematic format for (seismic) equipment qualification standards, 8:33770 (R:US)
SELENIUM
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)

SELENIUM COMPOUNDS
Crystal Structure
New $(TMTSF)_2X$ derivatives: a change in the selenium network dimensionality derived from the molecular and crystal structures of $(TMTSF)_2(FSO_3)$[T = 298K, 123K] and $(TMTSF)_2(BrO_4)$ T = 298K, 8:34109 (J:GB)
Molecular Structure
New $(TMTSF)_2X$ derivatives: a change in the selenium network dimensionality derived from the molecular and crystal structures of $(TMTSF)_2(FSO_3)$[T = 298K, 123K] and $(TMTSF)_2(BrO_4)$ T = 298K, 8:34109 (J:GB)
SELENIUM ISOTOPES
Neutron Reactions
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
SEMICONDUCTOR COUNTERS
See SEMICONDUCTOR DETECTORS
SEMICONDUCTOR DETECTORS
See also HGI2 SEMICONDUCTOR DETECTORS
Large-area non-crystalline semiconductor detectors, 8:34379 (R:US)
Performance Testing
Calibration of semiconductor gamma spectrometer by means of limited number of energy standards, 8:34473 (RA:SU:In Russian)
SEMICONDUCTOR DEVICES
See also SEMICONDUCTOR LASERS
THERMISTORS
Failures
Review of the physics and response models for burnout of semiconductor devices, 8:34249 (R:US)
SEMICONDUCTOR LASERS
Biological Effects
Functional analysis of laser-induced ocular damage, 8:34665 (RA:US)
SEMICONDUCTOR MATERIALS
If possible index also the specific compounds.
Catalytic Effects
Carbanion photooxidation at semiconductor surfaces, 8:34167 (J:US)
SENIOR CENTERS
See PUBLIC BUILDINGS
SEPARATORS (STEAM)
See STEAM SEPARATORS
SERPUKHOV SYNCHROTRON
Cavity Resonators
Optimization of dimensions of the accelerating resonator of an accelerating-storage complex, 8:34311 (RA:SU:In Russian)
Storage Rings
Optimization of dimensions of the accelerating resonator of an accelerating-storage complex, 8:34311 (RA:SU:In Russian)
SEWAGE SLUDGE
Radiosterilization
Disinfection of sewage sludge with gamma radiation, 8:34587 (RA:DE:In German)
Waste Processing
Treatment of waste water and sewage sludge - research promoted by the BMFT, 8:34588 (R:US)
SHADING
Calculation Methods
Fine tuning solar access: calculators and computers as design tools, 8:33471 (J:US)
Simulation
Climatological sundial, 8:33469 (J:US)
SHALE TAR OILS
Hydrogenation
Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R:DE:In German)
Pyrolysis
Investigations on hydropyrolysis of heavy crude and residual oil, 8:33137 (R:DE:In German)
SHALES
Chemical Analysis
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Deformation
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
Radionuclide Migration
Characterization of hydrofracture grouts for radionuclide migration, 8:33196 (R:US)
Thermal Stresses
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
SHELLS
Structural forms; for electron shells in atoms use ELECTRONIC STRUCTURE.
Implosions
Instability localized at the inner surface of an imploding spherical shell, 8:34929 (R:US)
SHELLS (CONTAINMENT)
See CONTAINMENT SHELLS
SHIELDING
Design
EBT-P gamma-ray-shielding analysis, 8:34922 (R:US)
Neutron Transport
Evaluation of the streaming-matrix method for discrete-ordinates duct-streaming calculations, 8:34854 (R:US)
Reviews
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
SHORT CIRCUITS
See ELECTRICAL FAULTS
SHORT ROTATION CULTIVATION
Economic Analysis
Biomass, 8:33353 (RA:US)
Environmental Effects
Biomass, 8:33353 (RA:US)
SHOWER COUNTERS
Detects high energy gamma radiation or high energy particles on basis of cascade showers in layered absorbers.
Operation of the AFS at L = 1.4×10^{33} cm^{-2} sec^{-1}; a first look at data at high luminosity from the CERN ISR (Axial Field Spectrometer), 8:34301 (R:US)
Trigger Circuits
Fast asynchronous level 1 pre-trigger for electrons at L = $10^{33}cm^{-2}sec^{-1}$, 8:34300 (R:US)
SHUTTERS
Design
Reducing edge losses in multilayer curtain type window shutters, 8:33906 (J:US)
Performance Testing
Reducing edge losses in multilayer curtain type window shutters, 8:33906 (J:US)
SIALON
See ALUMINIUM OXIDES
SILICON NITRIDES
SICK LEAVE
Audits
Sick leave administration, 8:33787 (R:US)
SICKLE CELL ANEMIA
Pathology
Regulation of red blood cell production in human beings by erythropoietin, 8:34477 (RA:US)
SIGMALOG
See MWD SYSTEMS
SILANES
Photolysis
147-nm photolysis of phosphine-silane mixtures, 8:34190 (J:CH)
SILICA
Catalytic Effects
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Review of the in-bed hydrocarbon, alkali, and trace metals control in coal conversion processes: experimental studies on the control of hydrocarbons emission from a gasifier. Quarterly technical progress report No. 3, March-May 1982, 8:32950 (R:US)

Crystal Structure
Catalytic functionalities of supported sulfides. II. Effect of support on Mo dispersion, 8:33139 (J:US)
Solubility
Amorphous silica solubilities. VI. Postulated sulfate-silicic acid solution complex, 8:34100 (J:US)
SILICIC ACID
Chemical Reactions
Amorphous silica solubilities. VI. Postulated sulfate-silicic acid solution complex, 8:34100 (J:US)
SILICON
Deposition
Deposit of polycrystalline layers of silicon on a conducting substrate, beginning with the liquid phase. Final report, 8:33326 (R:XE:FR)
Materials Testing
Silicon material development for terrestrial solar cells, 8:34019 (R:DE:In German)
Materials Working
Silicon material development for terrestrial solar cells, 8:34019 (R:DE:In German)
Photoelectric Emission
Calculated initial energies of electrons in Si and SiO_2 irradiated by photons with energies up to 2 MeV, 8:34855 (J:NL)
Physical Radiation Effects
Stopping of alpha-recoil atoms in silicon, 8:33219 (RA:IL)
Surface Ionization
Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J:NL)
SILICON 28 BEAMS
RBE
Carcinogenic and mutagenic effects of energetic silicon ions on cultured mammalian cells, 8:34593 (RA:US)
Life-shortening effects of heavy charged particles: a status report, 8:34600 (RA:US)
Response of mouse marrow colony forming units (CFU-S) to heavy charged particles, 8:34599 (RA:US)
SILICON 28 REACTIONS
Resonance
Resonances in heavy systems, 8:34806 (R:US)
SILICON 28 TARGET
Silicon 28 Reactions
Resonances in heavy systems, 8:34806 (R:US)
SILICON 33
Search for new isotopes at Brookhaven, 8:34809 (J:US)
SILICON ALLOYS
Annealing
Annealing studies of amorphous alloys, 8:34247 (R:US)
SILICON ARSENIDES
Phase Studies
Phase stability and microstructural characteristics of bulk glassy CdGe/sub 1-x/Si/sub x/As$_2$ alloys, 8:34047 (J:GB)
SILICON CARBIDES
Materials Testing
Development of ceramic automobile turbine engine components, 8:33947 (R:DE:In German)
SILICON FLUORIDES
Excitation
Tunable laser diode study of the ν_3 band of SiF_4 near 9.7 μm, 8:34106 (J:US)
SILICON HYDRIDES
See SILANES
SILICON IONS
Energy-Level Transitions
Lifetimes of low-lying $^3P^0$, ^3D, and $^3F^2$ states of the Al I isoelectronic sequence, 8:34730 (J:SE)
SILICON NITRIDES
Materials Testing
Development of ceramic automobile turbine engine components, 8:33947 (R:DE:In German)
Microanalysis
Quantification of energy loss measurements with the use of K and L absorption edges, 8:34075 (BA:US)
Physical Radiation Effects
Space-charge effects in irradiated Si_3N_4 films, 8:34384 (R:US)
SILICON OXIDES
See also CRISTOBALITE
SILICA
Photoelectric Emission
Calculated initial energies of electrons in Si and SiO_2 irradiated by photons with energies up to 2 MeV, 8:34855 (J:NL)
SILICON SOLAR CELLS
Annealing
Effects of processing and dopant on radiation damage removal in silicon solar cells, 8:33330 (R:US)
Grain Boundaries
Studies of grain boundaries in small-grained polycrystalline silicon solar cells, 8:33359 (J:US)
Ion Implantation
Effects of processing and dopant on radiation damage removal in silicon solar cells, 8:33330 (R:US)
Physical Radiation Effects
Effects of processing and dopant on radiation damage removal in silicon solar cells, 8:33330 (R:US)
SILICONES
Silicone encapsulant development for fireset applications, 8:34017 (R:US)
SILOXANES
See also SILICONES
Gas Chromatography
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
Infrared Spectra
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
Mass Spectra
Organic analysis with a combined capillary gas chromatograph/mass spectrometer/Fourier transform infrared spectrometer, 8:34149 (J:US)
SILVER
Surface Properties
High sensitivity surface crystallography: illustrative LEED analyses of Cu(100) and Ag(110), 8:33990 (J:GB)
SIMS
See MASS SPECTROSCOPY
SINGULARITY
Breakdown of predictability: an investigation on the nature of singularities, 8:34888 (R:XA)
SKELETON
See also BONE JOINTS
Biomedical Radiography
Determination of the anatomic borders of the irradiation area for cervical and corporal carcinomas, 8:34514 (R:DE:In German)
Pathological Changes
Non-stochastic effects of ^{226}Ra and ^{228}Ra in the human skeleton, 8:34585 (R:US)
SKIN
Carcinogenesis
Strain differences and solvent effects in mouse skin carcinogenesis experiments using carcinogens, tumor initiators, and promoters, 8:34616 (R:US)
Neoplasms
Multistage skin tumor promotion: involvement of a protein kinase, 8:34645 (BA:US)
Tumor Promoters
Multistage skin tumor promotion: involvement of a protein kinase, 8:34645 (BA:US)
Ultraviolet Radiation
Dose-time relationship for UV-tumorigenesis, 8:34663 (RA:DE)
SLAGS
Corrosive Effects
Coal slag-refractory compatibility studies: progress to date, 8:33009 (J:US)
Solubility
Theoretical studies of slag exchange equilibria, 8:33013 (J:CA)
Thermodynamic Activity
Approximations to activity surfaces for slags in potassium-seeded coal flames, 8:33878 (R:US)

SLOT OVENS
See COKE OVENS
SLUDGES
See also SEWAGE SLUDGE
Anaerobic Digestion
Manure and energy from municipal wastes through biogas-fermentation, 8:33942 (R:SE:In Swedish)
Biodegradation
Reclamation and disposal of water-based machining coolants, 8:34451 (RA:US)
Chemical Composition
Advanced fossil energy program, 8:34452 (RA:US)
Materials Handling
Removal of sludge from waste tanks, 8:33212 (R:US)
Tank 16 demonstration: single-pump test results, 8:33210 (R:US)
Pumping
Tank 16 demonstration: multipump test results, 8:33211 (R:US)
Tank 16 demonstration: single-pump test results, 8:33210 (R:US)
Removal
Removal of sludge from waste tanks, 8:33212 (R:US)
Waste Disposal
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)
Waste Processing
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Waste Product Utilization
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
SLURRIES
See also FUEL SLURRIES
Erosion
Slurry erosion of materials, 8:33003 (BA:US)
SLURRIES (FUEL)
See FUEL SLURRIES
SLURRY PIPELINES
Economics
Pumping of peat slurry - at long distances, 8:33081 (R:SE:In Swedish)
Pumping
Pumping of peat slurry - at long distances, 8:33081 (R:SE:In Swedish)
SMALL BUSINESSES
Report to Congress on the Small-Business Program of the Department of Energy, 8:33795 (R:US)
SNG
See HIGH BTU GAS
SODIUM
Desorption
Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J:NL)
Evaporation
Development of on-line monitoring device to detect the presence/absence of sodium vapor, 8:33191 (R:US)
Mass Spectroscopy
Development of on-line monitoring device to detect the presence/absence of sodium vapor, 8:33191 (R:US)
SODIUM CHLORIDES
Electric Conductivity
Electrical conductivity of molten mixtures of antimony(III) chloride-aluminum chloride and antimony(III) chloride-aluminum chloride-sodium chloride, 8:34111 (J:US)
Electrochemistry
Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$, 8:34173 (R:DE:In German)
Hot Pressing
Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R:US)
Permeability
Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R:US)
Temperature Gradients
Brine migration in hot-pressed polycrystalline sodium chloride, 8:34671 (R:US)
Thermodynamic Activity
Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of Nacl and CaCl at 25°C, 8:34116 (J:US)
Vapor Pressure
Isopiestic studies of aqueous solutions at elevated temperatures. III. $[(1-y)NaCl + yCaCl_2]$, 8:34139 (J:GB)
SODIUM CITRATES
See SODIUM COMPOUNDS
SODIUM COMPOUNDS
See also SODIUM CHLORIDES
SODIUM SULFATES
Agglomeration
Effect of impurities on partial molal volume and critical micelle concentration of sodium dodecyl sulfate. Correction of micelle aggregation number, 8:34159 (J:US)
SODIUM IODIDE DETECTORS
See NAI DETECTORS
SODIUM IODOHIPPURATE
See HIPPURAN
SODIUM LAURYL SULFATES
See SODIUM COMPOUNDS
SODIUM MINERALS
See MINERALS
SODIUM SULFATES
Chemical Reactions
Amorphous silica solubilities. VI. Postulated sulfate-silicic acid solution complex, 8:34100 (J:US)
SOIL CONSERVATION
Government Policies
Impacts of technology on US cropland and rangeland productivity, 8:34475 (R:US)
SOILS
Engineering Geology
Salts in soil and water within the arid climate zone. Effects on engineering geology, exemplified from Saudi Arabia, 8:34436 (R:SE:In Swedish)
Radionuclide Migration
Health effects associtated with unit radonuclide releases to the environment, 8:33249 (RA:US)
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radionuclide distributions around a low-level radioactive waste disposal pond and ditch system at the Hanford Site, 8:33244 (R:US)
Radon diffusion in candidate soils for covering uranium mill tailings, 8:33240 (R:US)
Soil and vegetation, 8:34429 (RA:US)
Thermal Conductivity
Methods for the determination of thermal properties of soils and rocks, 8:33568 (R:SE:In Swedish)
Thermal Diffusion
Time dependence of ground heat loss from solar ponds, 8:33538 (R:US)
Thermal Diffusivity
Methods for the determination of thermal properties of soils and rocks, 8:33568 (R:SE:In Swedish)
SOLAR ABSORBERS
Optical Properties
Preparation and characterization of solar absorbing films on stainless steel, 8:33541 (R:SE:In Swedish)
Surface Coating
Preparation and characterization of solar absorbing films on stainless steel, 8:33541 (R:SE:In Swedish)
SOLAR ACCESS
Prior to September 1980 this concept was indexed to SOLAR RIGHTS.
Solar access as an investment strategy for builders, 8:33315 (J:US)
Solar siting and access protection in new development, 8:33312 (J:US)

SOLAR AIR CONDITIONERS
Performance
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R:US)
SOLAR AIR HEATERS
Computerized Simulation
Thermosiphoning air panels: going with the flow, 8:33545 (J:US)
Laminar Flow
Transpired solar air heaters. Volume 3. Effect of wall suction on laminar entrance flow with application to solar air heaters. Final report, 8:33540 (R:US)
Performance
Revised renewable resource calculation procedures for the RCS program, 8:33410 (R:US)
Performance Testing
Thermosiphoning air panels: going with the flow, 8:33545 (J:US)
Temperature Effects
Temperature extremes in vertical collectors, 8:33546 (J:US)
Thermosyphon Effect
Thermosiphoning air panels: going with the flow, 8:33545 (J:US)
SOLAR CELLS
See also CADMIUM SULFIDE SOLAR CELLS
CADMIUM TELLURIDE SOLAR CELLS
SILICON SOLAR CELLS
Heat Transfer
Study of solar module technology with good thermal dissipation. Final report, 8:33323 (R:XE:FR)
SOLAR COLLECTORS
See also SOLAR AIR HEATERS
SOLAR PONDS
Design
Neutral density transparent solar collector, 8:33547 (J:US)
Glazing Materials
Neutral density transparent solar collector, 8:33547 (J:US)
Inclination
Solar domestic hot water in Seattle: the relative effects of collector tilt and orientation of annual performance or Ma'am the roof is the least of your worries, 8:33431 (J:US)
Orientation
Solar domestic hot water in Seattle: the relative effects of collector tilt and orientation of annual performance or Ma'am the roof is the least of your worries, 8:33431 (J:US)
SOLAR COOLING SYSTEMS
See also PASSIVE SOLAR COOLING SYSTEMS
SOLAR AIR CONDITIONERS
SOLAR REFRIGERATORS
Mathematical Models
Development of a day by day simulation of solar systems, 8:33408 (R:US)
SOLAR DOMESTIC WATER HEATING
See SOLAR WATER HEATING
SOLAR ENERGY
Non-governmental research and development investments in selected energy technologies. Summary report, 8:33804 (R:US)
Bibliographies
Solar power generation: a bibliography with abstracts. Quarterly update, October-December, 1982, 8:33279 (R:US)
Environmental Effects
Estimate of the potentials of land use for solar energy on the basis of soil/climate criteria and grassland cultivation: case study; France (scale 1/1 000 000). Summary report, 8:33308 (R:US)
Forecasting
Solar energy futures in a Western European context, 8:33824 (R:DE:In German)
Solar energy futures in a Western European context, 8:33825 (R:DE:In German)
Public Opinion
What do homeowners think? (National study of the residential solar consumer), 8:33309 (J:US)
Surveys
What do homeowners think? (National study of the residential solar consumer), 8:33309 (J:US)
SOLAR FRACTION
Calculation Methods
Direct estimation of the performance of passive structures, 8:33450 (J:US)
Passive solar performance fraction relative to the actual building, 8:33462 (J:US)
Comparative Evaluations
Passive solar performance fraction relative to the actual building, 8:33462 (J:US)
SOLAR HEATING SYSTEMS
See also PASSIVE SOLAR HEATING SYSTEMS
Data Acquisition Systems
Interfacing a $10 calculator for data acquisition, 8:33436 (J:US)
Design
Point system: a simple design tool, 8:33459 (J:US)
Thermosiphon floor heating system: design considerations and performance data, 8:33427 (J:US)
Feasibility Studies
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
Hybrid Systems
Hybrid solar application in a demonstration home for the N.A.H.B., 8:33508 (J:US)
Thermal interaction in a hybrid house, 8:33420 (J:US)
Mathematical Models
Development of a day by day simulation of solar systems, 8:33408 (R:US)
Performance
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R:US)
Performance analysis and optimization of the University of Pennsylvania retrofitted solar-heated Philadelphia row home. Final report, 8:33404 (R:US)
Thermosiphon floor heating system: design considerations and performance data, 8:33427 (J:US)
Rock Beds
Evolution of the air thermosiphon: toward production housing, 8:33429 (J:US)
Site Selection
Solar siting and access protection in new development, 8:33312 (J:US)
Solar Air Heaters
Evolution of the air thermosiphon: toward production housing, 8:33429 (J:US)
Thermal Analysis
Thermal interaction in a hybrid house, 8:33420 (J:US)
Thermosyphons
Evolution of the air thermosiphon: toward production housing, 8:33429 (J:US)
Thermosiphon floor heating system: design considerations and performance data, 8:33427 (J:US)
Windows
Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting, 8:33499 (J:US)
SOLAR ONE POWER PLANT
See BARSTOW SOLAR PILOT PLANT
SOLAR PONDS
Heat Losses
Time dependence of ground heat loss from solar ponds, 8:33538 (R:US)
SOLAR PROCESS HEAT
Chemical Heat Pipes
Open-loop transport of solar energy using natural-gas networks, 8:33354 (R:US)
Parabolic Dish Collectors
Advanced solar thermal technology, 8:33543 (J:US)
SOLAR REFRIGERATORS
Absorption Refrigeration Cycle
Development of a solar, absorption-type refrigerator - preliminary study in the course of scientific cooperation between Austria and India, 8:33405 (R:AT:In German)
SOLAR SEA POWER PLANTS
See OCEAN THERMAL POWER PLANTS

SOLAR SYSTEM
Chemical Composition
KeV neutron capture cross sections for the s-process isotopes of Se, Br, and Kr and the abundance of krypton in the solar system, 8:34821 (J:US)
SOLAR WATER HEATERS
See also PASSIVE SOLAR WATER HEATERS
Energy provision for the Seychelles. Producer gas and other opportunities, 8:33877 (R:SE)
Performance
Monitoring of the performance of a solar-heated-and-cooled apartment building. Final report, 8:33412 (R:US)
Solar domestic hot water in Seattle: the relative effects of collector tilt and orientation of annual performance or Ma'am the roof is the least of your worries, 8:33431 (J:US)
SOLAR WATER HEATING
Use for solar domestic water heating; not for process hot water.
Mathematical Models
Development of a day by day simulation of solar systems, 8:33408 (R:US)
SOLAR WIND
Magnetohydrodynamics
Stationarity of magnetohydrodynamic fluctuations in the solar wind, 8:34684 (R:US)
SOLID SCINTILLATION DETECTORS
See also NAI DETECTORS
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
SOLID STATE PHYSICS
Research Programs
Final report on R + D works in 1981, 8:34792 (R:DE:In German)
SOLID WASTES
Biodegradation
Advanced fossil energy program, 8:34452 (RA:US)
Bulk Density
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Chemical Composition
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Compression Strength
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Leaching
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Particle Size
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Permeability
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
Waste Disposal
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Solid waste disposal system, 8:33193 (RA:US)
Waste Management
Earth sciences, 8:34677 (RA:US)
Waste Product Utilization
Dry flue gas desulfurization end-product disposal Riverside demonstration facility experience, 8:33052 (RA:US)
SOLIDS
Charged-Particle Transport
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
Ionic Conductivity
NMR studies of fast-ion conductors, 8:34863 (R:US)
Sorptive Properties
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
Surface Properties
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
SOLVATED ELECTRONS
G Value
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)
SOMMERFELD INTEGRALS
Computer modeling of antennas near the ground, 8:34887 (J:US)
SORBENT RECOVERY SYSTEMS
Performance Testing
Field testing of PCB sorbent materials for use in outside capacitor areas, 8:34261 (RA:US)
SOUTH CAROLINA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
SOUTH DAKOTA
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
SOUTH KOREA
See REPUBLIC OF KOREA
SOYBEANS
Ultraviolet Radiation
UV-B irradiation effects on soybean photosynthetic recovery from water stress, 8:34660 (RA:DE)
SPACE HVAC SYSTEMS
Heating, ventilation, and air conditioning systems.
Computerized Simulation
Simulation of HVAC equipment in the DOE-2 program, 8:33893 (R:US)
SPACE POWER REACTORS
See also SPACE PROPULSION REACTORS
Heat Pipes
Development and test of a space-reactor-core heat pipe, 8:33692 (R:US)
Specifications
Nuclear energy in space, 8:33693 (TJ:US)
SPACE PROPULSION REACTORS
Specifications
Nuclear energy in space, 8:33693 (TJ:US)
SPACE VEHICLES
Radioisotope Batteries
Nuclear energy in space, 8:33693 (TJ:US)
Thermal Analysis
Studies of implicit and explicit solution techniques in transient thermal analysis of structures, 8:34235 (R:US)
SPACE-TIME
Scale Invariance
Invariant systems under the space-time inversion. Existence of the two kinds of the invesions, 8:34884 (R:JP)
SPARK GAPS
Air
Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA:US)
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)
Corona Discharges
Effect of grounded enclosure on the field distribution of rod-plane gaps, 8:34867 (RA:US)
Formative time lag in SF_6 and N_2, 8:34030 (RA:US)
Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA:US)
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)
Statistical time-lag to spark breakdown in high pressure SF_6, 8:34031 (RA:US)
Statistical voltage-time curves of an SF_6-insulated coaxial-cylinder gap, 8:34032 (RA:US)
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Voltage-time characteristic of particle-initiated breakdown in SF_6 gas, 8:34033 (RA:US)

Dusts
Influence of particulate matter on the breakdown of large sphere-gaps, 8:34034 (RA:US)
Electric Fields
Effect of grounded enclosure on the field distribution of rod-plane gaps, 8:34867 (RA:US)
Electrodes
Influence of the nature of electrode material on the production of corrosive species in a corona discharge, 8:34037 (RA:US)
Negative polarity dc breakdown of rod/plane gaps up to 1 MV, as affected by protrusions from the plane, 8:33634 (RA:US)
Flashover
Negative polarity dc breakdown of rod/plane gaps up to 1 MV, as affected by protrusions from the plane, 8:33634 (RA:US)
Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing, 8:33642 (RA:US)
Gases
Ultrasonic detection of particle movement and partial discharges in gas insulated apparatus, 8:34035 (RA:US)
Nitrogen
Formative time lag in SF_6 and N_2, 8:34030 (RA:US)
Performance Testing
Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing, 8:33642 (RA:US)
Sulfur Fluorides
Formative time lag in SF_6 and N_2, 8:34030 (RA:US)
Statistical time-lag to spark breakdown in high pressure SF_6, 8:34031 (RA:US)
Statistical voltage-time curves of an SF_6-insulated coaxial-cylinder gap, 8:34032 (RA:US)
Time lags in SF_6 under impulse conditions, 8:34028 (RA:US)
Voltage-time characteristic of particle-initiated breakdown in SF_6 gas, 8:34033 (RA:US)

SPARK IGNITION ENGINES
Combustion Kinetics
Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R:DE:In German)
Computerized Simulation
Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R:DE:In German)
Exhaust Gases
Method for precalculating the change of the combustion process in Otto-engines under changed operational conditions, 8:33949 (R:DE:In German)
Knock Control
Determination of a knock criterion of the Otto-engine combustion and precalculation of the knock limit, 8:33950 (R:DE:In German)

SPARKS (ELECTRIC)
See ELECTRIC SPARKS

SPECIMEN HOLDERS
See SAMPLE HOLDERS

SPECTRALLY SELECTIVE SURFACES
Optical Properties
Solar absorbing properties of thermally oxidized stainless steel, 8:33542 (R:SE:In Swedish)

SPECTROCHEMISTRY
See ABSORPTION SPECTROSCOPY
EMISSION SPECTROSCOPY

SPECTROMETERS
See also ELECTRON SPECTROMETERS
GAMMA SPECTROMETERS
INFRARED SPECTROMETERS
MAGNETIC SPECTROMETERS
NEUTRON SPECTROMETERS
PROTON SPECTROMETERS
ULTRAVIOLET SPECTROMETERS
X-RAY SPECTROMETERS
Phase-fluctuation optical heterodyne spectrometer as a non-destructive detector for gas chromatography, 8:34077 (J:NL)
Specifications
NOI-6 N-15 analyzer, 8:34375 (RA:CS)

SPECTROSCOPY
See also ABSORPTION SPECTROSCOPY
EMISSION SPECTROSCOPY
GAMMA SPECTROSCOPY
LASER SPECTROSCOPY
MASS SPECTROSCOPY
Optimization
Recent advances in optimization strategies: chromatography, electrochemistry, and spectroscopy, 8:34071 (J:US)
Technology Assessment
Fourier transform nuclear quadrupole resonance spectroscopy, 8:34067 (BA:US)

SPENT FUEL CASKS
Remote Handling
Design of a redundant-load-path lifting fixture for the Clinch River Breeder Reactor Plant spent-fuel shipping cask, 8:34222 (R:US)

SPENT FUEL ELEMENTS
Transport
US Department of Energy/Nevada Operations experience in the transport of spent nuclear reactor fuel assemblies, 8:33186 (R:US)

SPENT FUEL STORAGE
See also AWAY-FROM-REACTOR STORAGE
DRY STORAGE
Containers
Impact tests with fuel element cans, 8:34218 (R:DE:In German)
Technology Assessment
Interim storage of spent fuel elements in transport containers in the yard of the nuclear power plant Wuergassen, 8:34467 (R:DE:In German)

SPERM
See SPERMATOZOA

SPERMATIDS
See SPERMATOZOA

SPERMATOZOA
Scanning Electron Microscopy
Differential scattering of circularly polarized light by the helical sperm head from the octopus Eledone cirrhosa, 8:34056 (RA:US)

SPHERES (FUEL)
See FUEL SPHERES

SPHEROIDS
Radiobiology
Cell age distribution in multicell tumor spheroids, 8:34596 (RA:US)

SPIN
Measure Theory
Limitations on quantum measurements II: Analysis of a model example, 8:34871 (R:XA)
Quantum limitations for spin measurements on systems of arbitrary spin, 8:34872 (R:XA)

SPINACH
Photosynthesis
Critical reassessment of the photosystem II content in bundle sheath chloroplasts of young leaves of Zea mays, 8:34492 (BA:US)
Ultraviolet Radiation
Effect of UV irradiation on the primary processes of photosynthesis, 8:34582 (RA:DE)

SPIN-OFF
See TECHNOLOGY TRANSFER

SPOIL BANKS
Fires
Controlled burnout at an abandoned coal mine fire, 8:33059 (RA:US)

SPONDYLITIS
Diagnosis
Scintigraphic evaluation of the sacroiliac joints in anklylosing spondylitis, 8:34523 (R:DE:In German)
Radiotherapy
Spondylarthritis Ankylopoietica and its treatment with thorium X. Follow-up examinations carried out on patients of the Orthopaedic University Clinics Wuerzburg (Universitaetsklinik Wuerzburg), 8:34529 (R:DE:In German)

SRC-II PROCESS
Catalysis
Disposable catalyst for coal liquefaction, 8:33008 (J:US)
Demonstration Plants
SRC II - demonstration plant project for synfuel production from coal in the USA, 8:32944 (R:DE:In German)
Planning
SRC II - demonstration plant project for synfuel production from coal in the USA, 8:32944 (R:DE:In German)
STAINLESS STEEL-304
Cavitation
Mechanics and mechanisms of intergranular cavitation in creeping alloys, 8:33995 (BA:NL)
Erosion
Erosion behavior of materials in multiphase flows, 8:33980 (BA:US)
Stress Corrosion
Ranking of environments in stress-corrosion cracking, 8:33955 (R:US)
STAINLESS STEEL-304L
Cracking
Influence of metallurgical variables on hydrogen assisted cracking of austenitic stainless steels, 8:33961 (RA:IL)
STAINLESS STEEL-316
Physical Radiation Effects
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R:US)
STAINLESS STEEL-316L
Cracking
Influence of metallurgical variables on hydrogen assisted cracking of austenitic stainless steels, 8:33961 (RA:IL)
STAINLESS STEELS
See also STAINLESS STEEL-304, STAINLESS STEEL-304L, STAINLESS STEEL-316, STAINLESS STEEL-316L
Corrosion
Metal corrosion in oil shale retorts, 8:33169 (BA:US)
Selection and use of alloys for flue gas desulfurization systems, 8:33960 (RA:US)
Erosion
Erosion of metal alloys and their scales, 8:33978 (BA:US)
Fatigue
Fatigue strength improvement of welded high-strength steels StE 460 and StE 690 by TIG dressing, 8:33966 (R:DE:In German)
Fracture Properties
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
Underclad cracking in PWR reactor vessels, 8:33681 (TG:GB)
Solar Absorbers
Preparation and characterization of solar absorbing films on stainless steel, 8:33541 (R:SE:In Swedish)
Spectrally Selective Surfaces
Solar absorbing properties of thermally oxidized stainless steel, 8:33542 (R:SE:In Swedish)
STANDING CROP
See BIOMASS
STARFIRE TOKAMAK
Breeding Blankets
Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R:US)
STATE BUILDINGS
See PUBLIC BUILDINGS
STATISTICAL MECHANICS
Variational Methods
Variational approach to the statistical mechanics of hard discs and hard spheres, 8:34886 (J:GB)
STATISTICAL MODELS
Correlation Functions
Hydrodynamic asymptotics of correlation functions with account of fluctuations, 8:34880 (RA:SU:In Russian)
STEAM
Chemical Reactions
Kinetics and mechanism of the reaction between steam and hydrocarbons over nickel catalysts in the temperature range 350 to 500C-1, 8:33270 (J:US)
Water gas shift reaction. I, 8:33273 (J:IN)
STEAM COOLANT
See STEAM
STEAM GENERATORS
Computerized Simulation
Simplified moving boundaries HTGR steam generator model for the DSNP simulation language, 8:33684 (RA:IL)
Corrosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Design
Construction of helium-heated steam reformers for high-temperature-reactors, 8:33686 (R:DE:In German)
Test Facilities
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
Tubes
Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis (HTGR), 8:33682 (R:US)
STEAM INJECTION
Pipes
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
Test Facilities
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
STEAM LINES
Creep
Assessment of the creep damage and residual life of steam pipings, 8:33973 (R:FI:FI)
STEAM SEPARATORS
Corrosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Erosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
STEAM TURBINES
Corrosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Erosion
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
STEEL INDUSTRY
See METAL INDUSTRY
STEEL-ASTM-A302
Fracture Properties
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Physical Radiation Effects
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
STEEL-ASTM-A508
Fatigue
Effects of temperature on fatigue crack growth of a 508-2 steel in LWR environment, 8:33680 (R:US)
Fracture Properties
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Physical Radiation Effects
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Stress Corrosion
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
STEEL-ASTM-A533-B
Fracture Properties
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)
Physical Radiation Effects
Structural integrity of water-reactor pressure-boundary components. Annual report for 1982. Vol.1, 8:33665 (R:US)

Stress Corrosion
Reactor-safety research programs. Quarterly report, October-December 1982. Volume 4, 8:33758 (R:US)
STEELS
See also AUSTENITIC STEELS
CARBON STEELS
CHROMIUM STEELS
MANGANESE STEELS
STAINLESS STEELS
STEEL-ASTM-A302
STEEL-ASTM-A508
Corrosion
Mechanisms of corrosion and alloy response in coal liquid systems containing chlorides, 8:33004 (BA:US)
Metal corrosion in oil shale retorts, 8:33169 (BA:US)
Erosion
Erosion of metal alloys and their scales, 8:33978 (BA:US)
Heat Treatments
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels), 8:33968 (R:US)
Tensile Properties
Experimental buckling investigation of ring-stiffened cyclindrical shells under unsymmetrical axial loads, 8:33748 (R:US)
STELLARATORS
Plasma Macroinstabilities
Application of the stellarator expansion for plasma-stability studies in stellarators, 8:34905 (R:US)
STEREOCHEMISTRY
Tracer Techniques
Recoil generated radiotracers in studies of molecular dynamics, 8:34208 (J:US)
STIMULATED EMISSION DEVICES
See LASERS
STIRLING ENGINES
Thermodynamics
Stirling-engine thermodynamic analysis: a users guide to SEAM1, 8:34262 (R:US)
STOCHASTIC COOLING
Electrodes
Array of 1- to 2-GHz electrodes for stochastic cooling, 8:34288 (R:US)
Kinetic Equations
Stochastic cooling: recent theoretical directions, 8:34291 (R:US)
STORAGE BATTERIES
See ELECTRIC BATTERIES
STORAGE BATTERIES (LEAD-ACID)
See LEAD-ACID BATTERIES
STORAGE RINGS
See also CERN ISR
ISABELLE STORAGE RINGS
Beam Stacking
Isochronous stacking-ring approach to the HTE, 8:34290 (R:US)
STORAGE (SPENT FUEL)
See SPENT FUEL STORAGE
STORES
See COMMERCIAL BUILDINGS
STOVER
See AGRICULTURAL WASTES
STRAND BREAKS
Radioinduction
Radiological physics and chemistry, 8:34195 (RA:US)
STRATEGIC PETROLEUM RESERVE
Strategic Petroleum Reserve and brine-disposal problem, 8:33157 (R:US)
STREAMER SPARK CHAMBERS
Specifications
Streamer spectrometer for the study of rare neutron reactions, 8:34377 (RA:SU:In Russian)
STREETS
See ROADS
STRESS ANALYSIS
Finite Element Method
Thermo-elastoplastic material law for application of the finite element method to calculate thermal loads, 8:33965 (R:DE:In German)
STRESS CORROSION
MCC stress-corrosion-cracking rate tension test method (MCC-104S), 8:33967 (R:US)
STRING MODELS
Treating the interactions of extended particles through breaking and connection of strings.
Feynman Path Integral
Path integral of relativistic strings, 8:34783 (R:JP)
Supersymmetry
Path integral of relativistic strings, 8:34783 (R:JP)
STRIPPER FOILS
See BEAM STRIPPERS
STRIPPERS
See BEAM STRIPPERS
STRONTIUM
Adsorption
Precipitation process for decontamination of water-soluble SRP radioactive waste, 8:33202 (R:US)
Precipitation process for decontaminating water-soluble SRP radioactive waste, 8:33205 (R:US)
Binding Energy
Analytic potential functions for weakly bound molecules. Bonding in the alkaline earth diatomics, 8:34124 (J:NL)
STRONTIUM 86 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
STRONTIUM 89
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Foodstuffs, 8:34427 (RA:US)
STRONTIUM 90
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)
Environmental Exposure Pathway
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Environmental Transport
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Foodstuffs, 8:34427 (RA:US)
Soil and vegetation, 8:34429 (RA:US)
Wildlife, 8:34428 (RA:US)
STRONTIUM CHLORIDES
Solubility
Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of Nacl and CaCl at 25°C, 8:34116 (J:US)
Thermodynamic Activity
Isopiestic determination of the osmotic and activity coefficients of aqueous CsCl, $SrCl_2$, and mixtures of Nacl and CaCl at 25°C, 8:34116 (J:US)
STRUCTURAL MATERIALS
See BUILDING MATERIALS
STRUCTURE (MOLECULAR)
See MOLECULAR STRUCTURE
STRUCTURES (BUILDINGS)
See BUILDINGS
STRUCTURES (MECHANICS)
See MECHANICAL STRUCTURES
STYRENE
Toxicity
Health Hazards Evaluation Report No. HETA-81-098-941, Lab-Crest Scientific Glass Company, subsidiary of Fischer and Porter Company, Warminster, pennsylvania, 8:34629 (R:US)

SU-2 GROUPS
Gauge Invariance
Gauge unification of fundamental forces, 8:34779 (RA:BR)
SUBCRITICAL FLOW
See LAMINAR FLOW
SUBSIDENCE (GROUND)
See GROUND SUBSIDENCE
SUBURBS
See URBAN AREAS
SULFATES
See also LITHIUM SULFATES
POTASSIUM SULFATES
SODIUM SULFATES
Toxicity
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)
SULFONATES
For salts of sulfonic acids; for esters see SULFONIC ACID ESTERS.
Chemical Reactions
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
Removal
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
SULFUR
Comments on column characterization: a sulfur column, 8:34069 (J:DE)
Pollution Regulations
Emission of sulfur from combustion of coal and oil. Report in response to supplementary instructions to the project Coal Health Environment (Sweden), 8:33064 (R:SE:In Swedish)
SULFUR COMPLEXES
Chemical Reaction Kinetics
Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes, 8:34107 (J:NL)
SULFUR COMPOUNDS
See also SULFATES
SULFUR FLUORIDES
SULFUR OXIDES
Air Pollution
Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur, 8:34410 (BA:US)
Monitoring
Optimal spatial design for augmentation of a network of receptors for wet deposition of sulfur, 8:34410 (BA:US)
SULFUR DIOXIDE
Air Pollution Control
Current status of dry SO_2 control systems, 8:33044 (RA:US)
Materials problem: operating a closed-loop limestone FGD system, 8:33025 (RA:US)
Ecological Concentration
Evaluation of a prototype portable microwave multi-gas analyzer. Technical report, 8:34405 (R:US)
Electrochemistry
Studies on the method of voltammetric measurements in the liquid phases of $NaCl/AlCl_3/SO_2$, 8:34173 (R:DE:In German)
Environmental Transport
Relaxation of SO_2 emission limits for the PGDP steam plant, 8:34420 (RA:US)
Health Hazards
Effects of air pollution on airway function. Final report May 80-May 81, 8:34631 (R:US)
Health hazard evaluation report no. HETA-81-034,035-934, Colorado Springs Public Utilities, Colorado Springs, Colorado, 8:34403 (R:US)
Monitoring
Continuous emission monitoring of flue gas desulfurization systems, 8:34398 (RA:US)
Personnel Dosimetry
Personal passive monitors for chemical agents. Technical report, 8:34404 (R:US)
Pollution Regulations
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
Relaxation of SO_2 emission limits for the PGDP steam plant, 8:34420 (RA:US)
Removal
Atomization: the key to dry scrubbing at the Coyote Station, 8:33049 (RA:US)
Buffer additives for limestone scrubbing: a review of R and D results, 8:33037 (RA:US)
Commercial application experience with organic acid addition at City Utilities of Springfield, 8:33039 (RA:US)
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
Dry FGD pilot plant results: lime spray absorption for high sulfur coal and dry injection of sodium compounds for low sulfur coal, 8:33045 (RA:US)
Dry scrubbing at Northern States Power Company, Riverside Generating Plant, 8:33048 (RA:US)
EPRI spray drying pilot plant status and results, 8:33046 (RA:US)
Evaluation of alternative FGD system removal efficiency and reliability improvement options at Arizona Public Service Company's Four Corners Units 1, 2, and 3, 8:33041 (RA:US)
FGD chemistry and water integration, 8:33033 (RA:US)
Flue gas desulfurization operations at Apache Station, 8:33040 (RA:US)
Full-scale dual alkali FGD demonstration at Louisville Gas and Electric Company, 8:33031 (RA:US)
Full-scale utility flue gas desulfurization system characterization results, 8:33034 (RA:US)
Pilot plant evaluation of by-product dibasic acids as buffer additives for limestone flue gas desulfurization systems, 8:33051 (RA:US)
Proven reagent for high sulfur coal flue gas desulfurization, 8:33053 (RA:US)
Results of the Dowa technology tests at the Shawnee scrubber facility, 8:33030 (RA:US)
Results of industrial and utility boiler full-scale demonstration of adipic acid addition to limestone scrubbers, 8:33038 (RA:US)
Simultaneous removal of SO_2 and particulates from flue gas, 8:33054 (RA:US)
SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA:US)
SO/sub x/ and NO/sub x/ removal for coal-fired boilers in Japan, 8:33035 (RA:US)
Toxicity
Health Hazard Evaluation Report No. HETA-81-083-933, Salem Area Family Counseling Service, Salem, Oregon, 8:34628 (R:US)
Personal passive monitors for chemical agents. Technical report, 8:34404 (R:US)
Waste Water
FGD chemistry and water integration, 8:33033 (RA:US)
SULFUR FLUORIDES
Breakdown
77kV new type all-in-one SF_6 gas-insulated switchgear, 8:33647 (RA:US)
Charge accumulation on spacer surface at dc stress in compressed SF_6 gas, 8:33637 (RA:US)
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Critical avalanche size for impulse breakdown in quasi-uniform field SF_6 gaps, 8:34027 (RA:US)
Development of surface charges on epoxy resin spacers stressed with direct applied voltages, 8:33636 (RA:US)
Dielectric strength of SF_6 in divergent field configuration, 8:34024 (RA:US)
Effect of restriking spark on dielectric strength to ground in a model gas insulated disconnecting switch, 8:33646 (RA:US)
Formative time lag in SF_6 and N_2, 8:34030 (RA:US)
Impulse breakdown of SF_6/N_2 insulation. Influence of electrode covering. Polarity effects, 8:34036 (RA:US)

Pressure dependence of dc breakdown voltage and current for SF_6 in the inhomogeneous field, 8:34023 (RA:US)
Remotely controlled switching of HV spark gaps with application to impulse-superimposed ac testing, 8:33642 (RA:US)
Selection of h-v tests of SF_6 insulated systems from a physical and technical viewpoint, 8:33644 (RA:US)
Sparking potentials calculated from the electron-molecule collision properties of gases, 8:34705 (RA:US)
Statistical time-lag to spark breakdown in high pressure SF_6, 8:34031 (RA:US)
Statistical voltage-time curves of an SF_6-insulated coaxial-cylinder gap, 8:34032 (RA:US)
Surface discharge in SF_6, 8:33639 (RA:US)
Surface flashover of gas/solid interfaces, 8:33635 (RA:US)
Time lags in SF_6 under impulse conditions, 8:34028 (RA:US)
Voltage-time characteristics of breakdown in SF_6 (550 kV gas-insulated system), 8:33633 (RA:US)
Voltage-time characteristic of particle-initiated breakdown in SF_6 gas, 8:34033 (RA:US)

Corona Discharges
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Corona-induced decomposition of SF_6, 8:33640 (RA:US)
Corona stabilization in SF_6/N_2 mixtures under impulse conditions, 8:34734 (RA:US)
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA:US)
Study on metal fluoride products formation caused by the electric arc in SF_6, 8:34039 (RA:US)

Decomposition
Corona-induced decomposition of SF_6, 8:33640 (RA:US)
Study on metal fluoride products formation caused by the electric arc in SF_6, 8:34039 (RA:US)
Thermal decomposition of SF_6 and SF_6-air mixtures in substation environments, 8:34038 (RA:US)

Dielectric Properties
Experimental study of SF_6 gas-pressurized lapped-polypropylene cable for EHV transmission line, 8:33649 (RA:US)
High dielectric strength gas mixtures comprising sulphur hexafluoride, carbon monoxide and octafluorocyclobutane, 8:34025 (RA:US)
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)

Electric Sparks
Streamer-to-spark transition in short point-to-plane gaps, 8:34702 (RA:US)

Energy Levels
Onset of the molecular quasicontinuum in SF_6, 8:34117 (J:NL)

Excitation
Vibrational excitation in polyatomic molecules, 8:34189 (BA:US)

Gas Chromatography
Phase-fluctuation optical heterodyne spectrometer as a non-destructive detector for gas chromatography, 8:34077 (J:NL)

Infrared Spectra
Preferred orientation of guest molecules in low-temperature matrices: SF_6 in xenon, 8:34099 (J:NL)

Laser Spectroscopy
Interacting band analysis of the high-resolution spectrum of the $3\nu_6$ manifold of SF_6, 8:34132 (J:US)

Mixtures
Corona and breakdown in coaxial-electrode geometry in SF_6 and SF_6/N_2 mixtures, 8:34021 (RA:US)
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)

Molecular Structure
Interacting band analysis of the high-resolution spectrum of the $3\nu_6$ manifold of SF_6, 8:34132 (J:US)
Vibrational excitation in polyatomic molecules, 8:34189 (BA:US)

Orientation
Preferred orientation of guest molecules in low-temperature matrices: SF_6 in xenon, 8:34099 (J:NL)

Particulates
Voltage-time characteristic of particle-initiated breakdown in SF_6 gas, 8:34033 (RA:US)

Photoemission
Spectroscopic study of low pressure fluorine-containing gas discharge, 8:34706 (RA:US)

Photoionization
Study of prebreakdown processes influencing the volt-time characteristics of gaseous insulation, 8:34022 (RA:US)

Thermodynamic Properties
SF_6 thermophysical properties: engineering approach, 8:34041 (RA:US)

Thermoelectric Properties
SF_6 thermophysical properties: engineering approach, 8:34041 (RA:US)

Vibrational States
Interacting band analysis of the high-resolution spectrum of the $3\nu_6$ manifold of SF_6, 8:34132 (J:US)
Onset of the molecular quasicontinuum in SF_6, 8:34117 (J:NL)
Vibrational excitation in polyatomic molecules, 8:34189 (BA:US)

SULFUR IONS

Energy-Level Transitions
Lifetimes of low-lying $^2P^o$, ^2D, and $^2F^2$ states of the Al I isoelectronic sequence, 8:34730 (J:SE)

Ion-Atom Collisions
Atomic collision experiments utilizing low-velocity, highly-charged ion beams, 8:34697 (R:US)

SULFUR ISOTOPES

Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)

SULFUR OXIDES
See also SULFUR DIOXIDE

Chemical Radiation Effects
DOE's electron beam irradiation development program, 8:33036 (RA:US)

Removal
DOE's electron beam irradiation development program, 8:33036 (RA:US)
Proceedings: symposium on flue gas desulfurization. Volume 1, 8:33022 (R:US)

SULFUR SULFIDES
See SULFUR

SULFURIC ACID

Enthalpy
Standard enthalpy of formation of peroxymonosulfate (HSO_5p) and the standard electrode potential of the peroxymonosulfate-bisulfate couple, 8:33277 (J:GB)

Redox Potential
Standard enthalpy of formation of peroxymonosulfate (HSO_5^-) and the standard electrode potential of the peroxymonosulfate-bisulfate couple, 8:33277 (J:GB)

SUN

Altitude
Fine tuning solar access: calculators and computers as design tools, 8:33471 (J:US)

Azimuth
Fine tuning solar access: calculators and computers as design tools, 8:33471 (J:US)

Plasma Diagnostics
The Pinhole/Occulter facility, 8:34689 (R:US)

SUN CHARTS
Charts that map the height angle and horizontal angle of the sun for a given location and time.
Climatological sundial, 8:33469 (J:US)

SUN SHADES

Design
Rainy day shading: the effect of shading devices on daylighting and thermal performance, 8:33919 (J:US)

Scale Models
Rainy day shading: the effect of shading devices on daylighting and thermal performance, 8:33919 (J:US)

Thermal Efficiency
Rainy day shading: the effect of shading devices on daylighting and thermal performance, 8:33919 (J:US)

SUPERALLOYS
See HEAT RESISTING ALLOYS
SUPERCONDUCTING CAVITY RESONATORS
Fabrication
Superconducting accelerating structure for particle velocities from 0.12 to 0.23 c, 8:34264 (R:US)
SUPERCONDUCTING COMPOSITES
Electrical Properties
Metallurgy of continuous filamentary A15 superconductors, 8:34012 (BA:US)
Fabrication
Metallurgy of continuous filamentary A15 superconductors, 8:34012 (BA:US)
SUPERCONDUCTING MAGNETS
Design
Metallurgy of continuous filamentary A15 superconductors, 8:34012 (BA:US)
Magnet Coils
Conceptual magnet design for an iron-free colliding beam accelerator, 8:34289 (R:US)
Mechanical Structures
Magnet coil system for a superconducting spectrometer (HISS), 8:34315 (R:US)
Performance
9.1-T iron-free Nb-Ti dipole magnet with pancake windings, 8:34319 (R:US)
Radiation Heating
Radiation problems at superconducting high-intensity accelerators of high-energy protons, 8:34309 (RA:SU:In Russian)
SUPERGRAVITY
Geometry
Geometric formulation of supergravity, 8:34879 (RA:BR)
SUPEROXIDE RADICALS
O_2
Chemical Reactions
Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J:NL)
Quantitative Chemical Analysis
Some observations on the chemistry of KO_2-DMSO solutions, 8:34118 (J:NL)
SUPERSONIC FLOW
Combustion Kinetics
A model analysis of separation initiated external combustion in supersonic flow over a flat plate, 8:34232 (R:US)
SUPERSYMMETRY
Symmetry Breaking
B-L violating supersymmetric couplings, 8:34765 (R:US)
SUPERVOLTAGE RADIOTHERAPY
See RADIOTHERAPY
SUPPLY AND DEMAND
Systems Analysis
Embedding energy industry into economy, 8:33792 (R:DE:In German)
SUPPORTS
Installation
Fundamental examinations for the mechanisation of the support work in headings by blasting and by using selective cut heading machines, 8:34258 (R:DE:In German)
Stress Analysis
Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis (HTGR), 8:33682 (R:US)
SURFACE COATING
See also ELECTRODEPOSITION
Materials Testing
First-wall-coating candidates for ICF reactor chambers using dry-wall protection only, 8:34913 (R:US)
SURFACE MINING
Comparative Evaluations
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33074 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33075 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 2. Terrace pit planning and operations manual (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33073 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 1. Technical report (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33072 (R:US)
Environmental Effects
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33075 (R:US)
Feasibility Studies
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33074 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33075 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 2. Terrace pit planning and operations manual (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33073 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 1. Technical report (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33072 (R:US)
Land Reclamation
Erosion potential of reclaimed agricultural lands in Perry County. Final report, 8:34434 (R:US)
Mining Equipment
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33075 (R:US)
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 2. Terrace pit planning and operations manual (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33073 (R:US)
Planning
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 3. Data collection plan (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33074 (R:US)
Pollution Control
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
Socio-Economic Factors
Development of optimal terrace-pit coal-mining systems. Phase II report. Volume 4. Environmental assessment (Farmington, NM; terrace-pit vs conventional surface mining; and different haulage equipment), 8:33075 (R:US)
Waste Water
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
SURFACE PROPERTIES
Mathematical Models
Dynamical aspects of precursor state kinetics, 8:34128 (J:NL)
SURFACE WATERS
See also COASTAL WATERS
ESTUARIES
LAKES
SEAS
SWIMMING POOLS
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)

Radionuclide Migration
Health effects associtated with unit radonuclide releases to the environment, 8:33249 (RA:US)
SURFACE-ACTIVE AGENTS
See SURFACTANTS
SURFACING, HARD
See HARD FACING
SURFACTANTS
Biosynthesis
Biosurfactants and enhanced oil recovery, 8:33117 (RA:US)
Growth and biosurfactant production of a bacteria in continuous culture, 8:33105 (RA:US)
Microbial processes in the recovery of heavy petroleum, 8:33115 (RA:US)
Chemical Reactions
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
Removal
Effect of enhanced-oil-recovery chemicals on crude refining. Final report, 8:33138 (R:US)
SUSPENSIONS (FUEL)
See FUEL SLURRIES
SWEAT GLANDS
See GLANDS
SKIN
SWEDEN
Air Quality
Composition of the aerosol of a clean air region. Final report, 8:34399 (R:SE:In Swedish)
Energy Demand
Long range energy demand (Seven world regions and Sweden), 8:33794 (R:SE:In Swedish)
Energy Management
Effect of reduced dependence on oil. Some economic long-sighted calculations, 8:33822 (R:SE:In Swedish)
Energy Systems
Knowledge about energy. An inventory of Swedish energy systems studies and some hypothesis of research needs, 8:33806 (R:SE:In Swedish)
Geothermal Exploration
Geothermal energy extraction in Skaane. Final report, stage 4, 8:33552 (R:SE:In Swedish)
Geothermal Resources
Geothermal energy extraction in Skaane. Final report, stage 4, 8:33552 (R:SE:In Swedish)
Government Policies
Effect of reduced dependence on oil. Some economic long-sighted calculations, 8:33822 (R:SE:In Swedish)
Pollution Regulations
Emission of sulfur from combustion of coal and oil. Report in response to supplementary instructions to the project Coal Health Environment, 8:33064 (R:SE:In Swedish)
Prospecting
Geothermal energy extraction in Skaane. Final report, stage 4, 8:33552 (R:SE:In Swedish)
Reactor Safety
EPRI joins reactor project, 8:33811 (J:US)
Research Programs
Energy R and D in Sweden, 8:33805 (R:SE)
Knowledge about energy. An inventory of Swedish energy systems studies and some hypothesis of research needs, 8:33806 (R:SE:In Swedish)
SWIMMING POOLS
Solar Water Heating
Efficient energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Final report. Pt. A, 8:33409 (R:DE:In German)
SWITCHES
Electrical Faults
Effect of restriking spark on dielectric strength to ground in a model gas insulated disconnecting switch, 8:33646 (RA:US)
SWITZERLAND
Energy Policy
Catalogue of possible energy policy measures, 8:33848 (R:CH:In German)
Swiss energy concept, 8:33831 (R:CH:In German)
Swiss energy concept. Final report. Vol. 2, 8:33841 (R:CH:In German)
Energy Supplies
Energy supply assurance in Switzerland, 8:33838 (R:CH:In German)
Swiss energy concept, 8:33831 (R:CH:In German)
Swiss energy concept. Final report. Vol. 2, 8:33841 (R:CH:In German)
SYNCHROPHASOTRONS
See SYNCHROTRONS
SYNCHROTRONS
See also BROOKHAVEN AGS
SERPUKHOV SYNCHROTRON
Beam Bending Magnets
Dual-aperature dipole with 2nd harmonic, 8:34308 (R:US)
Superconducting Magnets
Radiation problems at superconducting high-intensity accelerators of high-energy protons, 8:34309 (RA:SU:In Russian)
SYNOVIA
See BONE JOINTS
SYNTHESIS GAS
Chemical Composition
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Underground coal gasification (UCG) - gas to methanol and MTG gasoline: an economic and sensitivity study, 8:32991 (RA:US)
Chemical Preparation
Catalytic steam reforming of hydrocarbon for production of synthesis gas, 8:33269 (J:IN)
Cost
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
Production
Synthesis gas production by the solar gas process, 8:32999 (J:US)
Water gas shift reaction. II, 8:33272 (J:IN)
Water gas shift reaction. I, 8:33273 (J:IN)
Purification
Comprehensive design and economic analysis of a commercial in situ coal gasification facility, 8:32990 (RA:US)
SYNTHETIC FUELS
Demonstration Plants
Future of synthetic fuels: a congressional view, 8:33861 (RA:US)
Environmental Impacts
Environmental impacts program, 8:33066 (RA:US)
Feasibility Studies
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)
Planning
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)
Production
Liquid fuels from the hydropyrolysis of biomass, 8:33268 (J:US)
Mini-OTEC 2 program plan for electrochemical and synthetic fuels demonstration, 8:33388 (RA:US)
Research Programs
Fossil energy's role in synthetic fuels (USA), 8:33097 (RA:US)
Future of synthetic fuels: a congressional view, 8:33861 (RA:US)
SYNTHETIC NATURAL GAS
See HIGH BTU GAS
SYNTHINE PROCESS
See FISCHER-TROPSCH SYNTHESIS

T

T4 HORMONE
See THYROXINE
TANDEM ELECTROSTATIC ACCELERATORS
Prior to February 1979,information was indexed to Van de Graaff Accelerators.
See also CRNL MP TANDEM ACCELERATOR

Accelerator Facilities
Status of the Cracow electrostatic accelerator project, 8:34332 (BA:US)
Baking
Baking procedure of the accelerator tube by means of low voltage arc discharge, 8:34275 (BA:US)
Beam Bunchers
Rehovot 14UD Pelletron: status report, 8:34331 (BA:US)
Beam Bunching
Design considerations and present status of beam bunching technology, 8:34296 (BA:US)
Beam Injection
First operation of the XTU-tandem 150 kv injector, 8:34333 (BA:US)
Construction
Development of the Tandar project, 8:34329 (BA:US)
Nuclear structure facility at Daresbury, 8:34325 (BA:US)
Design
Vivitron: new design for an electrostatic accelerator. Second step of the up-grading of the Strasbourg MP-10 (16 MV - 18 MV), 8:34277 (BA:US)
Electric Fields
Analyzed method for calculating the distribution of electrostatic field, 8:34298 (BA:US)
Up-grading of Strasbourg MP-10: results of the first step (13 to 16 MV), 8:34272 (BA:US)
Electrodes
Baking procedure of the accelerator tube by means of low voltage arc discharge, 8:34275 (BA:US)
Heavy Ion Accelerators
Intense low energy heavy ion beams from a tandem dynamitron, Part II, 8:34345 (BA:US)
Ion Beams
Improvements of the Munich MP-tandem, 8:34273 (BA:US)
Ion Sources
First operation of the XTU-tandem 150 kv injector, 8:34333 (BA:US)
Mass Spectrometers
Rare isotope detection and dating with tandem accelerators, 8:34341 (BA:US)
Toronto isotrace facility, 8:34343 (BA:US)
Modifications
Improvements of the Munich MP-tandem, 8:34273 (BA:US)
Operation of the upgraded Stony Brook FN tandem, 8:34330 (BA:US)
Molecular Beams
Use of molecular ion beams from a tandem accelerator, 8:34344 (BA:US)
Performance
Operation of the upgraded Stony Brook FN tandem, 8:34330 (BA:US)
Recent upgrading of the Brookhaven double MP facility and plans for the future, 8:34303 (R:US)
Rehovot 14UD Pelletron: status report, 8:34331 (BA:US)
Survey of large NEC accelerators: 1981, 8:34328 (BA:US)
Performance Testing
JAERI tandem accelerator facility, 8:34327 (BA:US)
Progress report on the XTU-tandem of the laboratori Nazionali di Legnaro, 8:34326 (BA:US)
Pulse Techniques
Different way to consider a pulsed beam, 8:34297 (BA:US)
Radioactive Materials
Negative ion beams of rare and radioactive isotopes, 8:34346 (BA:US)
Specifications
Status of the Cracow electrostatic accelerator project, 8:34332 (BA:US)

TANDEM MIRROR DEVICES
See TMX DEVICES

TANKS
Cleaning
Removal of sludge from waste tanks, 8:33212 (R:US)
Tank 16 demonstration: single-pump test results, 8:33210 (R:US)
Construction
Low cost site built fiberglass water containers for thermal mass and small scale aquaculture, 8:33525 (J:US)
Corrosion Protection
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Solar Water Heating
Practical and theoretical analysis of continuous selection of temperature layers in a hot water tank by an experimental tank and a simulation model, 8:33549 (R:DE:In German)
Stress Corrosion
Prevention of stress corrosion cracking in nuclear waste storage tanks, 8:33209 (R:US)
Temperature Distribution
Practical and theoretical analysis of continuous selection of temperature layers in a hot water tank by an experimental tank and a simulation model, 8:33549 (R:DE:In German)

TAR
See also COAL TAR
Thermal Cracking
Thermal cracking of tars and hydrocarbons by adding oxygen and steam, 8:33331 (R:SE:In Swedish)

TAR SANDS
See OIL SANDS

TECHNETIUM 99
Diagnostic Uses
Results and evaluation of non-invasive brain perfusion characteristics with /sup 99m/Tc pertechnetate in clinically neurologically healthy persons as well as in patients with intracranial growths, 8:34522 (R:DE:In German)
Scintigraphic evaluation of the sacroiliac joints in ankylosing spondylitis, 8:34523 (R:DE:In German)
Diffusion
Shallow land burial of solid low-level radioactive wastes - 30 years of experience at the Savannah River Plant, 8:33203 (R:US)

TECHNOLOGY ASSESSMENT
Comparative Evaluations
How power options stack up, 8:33812 (J:US)

TECHNOLOGY TRANSFER
Non-governmental research and development investments in selected energy technologies. Summary report, 8:33804 (R:US)

TELEMETRY
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)

TELLURIUM 130 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)

TELOPHASE
See MITOSIS

TEM
See ALKYLATING AGENTS

TEMPERATURE (BODY)
See BODY TEMPERATURE

TEMPERATURE EFFECTS
Mathematical Models
Modulation of fossil fuel production by global temperature variations, 8:33843 (J:GB)

TENNESSEE
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Rift Zones
New Madrid seismotectonic study. Summary of activities from 1977 through 1981, 8:34433 (R:US)

TERBIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
TERRESTRIAL ECOSYSTEMS
See also RANGELANDS
Ecological Succession
Terrestrial ecology, 8:34423 (RA:US)
Mathematical Models
Environmental resources, 8:34422 (RA:US)
Radionuclide Migration
Wildlife, 8:34428 (RA:US)
Regional Analysis
Environmental resources, 8:34422 (RA:US)
Systems Analysis
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
Environmental resources, 8:34422 (RA:US)
TERTIARY RECOVERY
See ENHANCED RECOVERY
TEST FACILITIES
Data Acquisition Systems
Data acquisition and control for LMFBR component testing, 8:33688 (R:US)
TESTING (MATERIALS)
See MATERIALS TESTING
TETRACYCLINES
Radiosensitivity Effects
Role of base damage in aberration formation: interaction of aphidicolin and x-rays, 8:34607 (BA:US)
TEXAS
Energy Source Development
Texas Energy and Natural Resources Advisory Council activities and accomplishments. Annual report, 8:33860 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
TEXTILES
Testing
Test results: textiles selected for direct gain passive buildings, 8:33478 (J:US)
TFTR REACTORS
Environmental Impacts
Environmental monitoring report for calendar year 1982, 8:34935 (R:US)
THALLIUM
Desorption
Interaction of K, Na, Li and Tl with silicon (111) and (100) surfaces; surface ionization and kinetics of desorption, 8:34048 (J:NL)
Environmental Exposure Pathway
Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods, 8:34633 (R:US)
Pharmacology
Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods, 8:34633 (R:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Toxicity
Environmental toxicology research on thallium: metabolic and toxicological studies in the rat as carried out by nuclear and radioanalytical methods, 8:34633 (R:US)
THALLIUM 205 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{113}Sn, $^{106\ 114}Cd$, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
THALLIUM HYDRIDES
Binding Energy
Relativistic modifications of covalent bonding in heavy elements. Calculations for TlH, 8:34123 (J:NL)
Chemical Bonds
Relativistic modifications of covalent bonding in heavy elements. Calculations for TlH, 8:34123 (J:NL)
Covalence
Relativistic modifications of covalent bonding in heavy elements. Calculations for TlH, 8:34123 (J:NL)
THE GEYSERS
See GEYSERS GEOTHERMAL FIELD
THERMAL CONDUCTIVITY
Measuring Methods
Technical inspection of thermal insulation. Ordinance. Determination of the heat conductivity of materials or the thermal resistivity of stacked and laminated material with the plate apparatus. Pt. 1, 2, 8:33899 (R:AT:In German)
THERMAL DECAY TIME LOG
See NEUTRON-GAMMA LOGGING
THERMAL EFFECTS
See TEMPERATURE EFFECTS
THERMAL ENERGY STORAGE EQUIPMENT
Design
Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures >=90°C, 8:33780 (R:DE:In German)
Efficiency
Model to calculate the temperature characteristics of heat storage basins, 8:33781 (R:DE:In German)
Fabrication
Design, construction and test of a heat-insulated pit-type heat store containing 30,000 m^3 hot water at temperatures >=90°C, 8:33780 (R:DE:In German)
Optimization
Model to calculate the temperature characteristics of heat storage basins, 8:33781 (R:DE:In German)
Performance Testing
Comparison of testing methods for latent-heat-storage devices, 8:33548 (R:US)
THERMAL ENVELOPE HOUSES
See DOUBLE ENVELOPE BUILDINGS
THERMAL INSULATION
Chemical Composition
Thermal insulation blanket material. Final Report, 8:34221 (R:US)
Comparative Evaluations
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)
Optimization
Joint optimization of solar and superinsulation in a cold climate, 8:33443 (J:US)
Optimum conservation in direct gain homes: a new freedom for designers, 8:33504 (J:US)
Retrofitting
Comparison between passive solar and superinsulation retrofits, 8:33446 (J:US)
THERMAL POLLUTION (AIR)
See AIR POLLUTION
THERMAL POLLUTION (WATER)
See WATER POLLUTION
THERMAL PROPERTIES
See THERMODYNAMIC PROPERTIES
THERMAL RADIATION
Emission Spectra
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4, 8:34688 (R:US)
THERMAL REACTORS
See also ANGRA-1 REACTOR
AVR REACTOR
BSR-1 REACTOR
BSR-2 REACTOR

BUDAPEST TRAINING REACTOR
CANDU TYPE REACTORS
DRESDEN-2 REACTOR
DRESDEN-3 REACTOR
HBWR REACTOR
HFIR REACTOR
LINGEN REACTOR
LWBR TYPE REACTORS
OBRIGHEIM REACTOR
RWE-BAYERNWERK REACTOR
SALEM-1 REACTOR
SEABROOK-2 REACTOR
THREE MILE ISLAND-1 REACTOR
THREE MILE ISLAND-2 REACTOR
THTR-300 REACTOR
WNP-2 REACTOR
WUERGASSEN REACTOR
WWER TYPE REACTORS
WYHL-1 REACTOR

Fuel Element Clusters
Thermal reactor analysis for cluster geometries, 8:33717 (RA:IL)

THERMISTORS
Fabrication
Microelectronic temperature sensor; silicon temperature sensor, 8:34385 (R:DE:In German)
Performance
Microelectronic temperature sensor; silicon temperature sensor, 8:34385 (R:DE:In German)

THERMODYNAMIC PROPERTIES
See also THERMAL CONDUCTIVITY
VAPOR PRESSURE
Mathematical Models
Incompatibility between the Kohler method and the subregular model, 8:34129 (J:GB)

THERMODYNAMICS
Mathematical Models
Thermomechanical theory for reacting immiscible mixtures, 8:34145 (J:DE)

THERMOLUMINESCENT DOSEMETERS
Annealing
Effect of annealing on sensitivity of some thermoluminescent dosemeters to ^{60}Co gamma radiation, 8:34367 (RA:CS:In Slovak)
Readout Systems
Application of TL evaluation equipment in personnel dosimetry - type NHZ-203 imported from Hungary, 8:34369 (RA:CS:In Czech)
Response Functions
Response of some detectors to thermal neutrons, 8:34370 (RA:CS:In Czech)
Sensitivity
Effect of annealing on sensitivity of some thermoluminescent dosemeters to ^{60}Co gamma radiation, 8:34367 (RA:CS:In Slovak)

THERMONUCLEAR DEVICES
Flanges
Remotely handled vacuum flange connections (ZEPHYR experiment), 8:34927 (R:DE:In German)

THERMONUCLEAR FUELS
Levitation
Generation of a strong core-centering force in a submillimeter compound droplet system, 8:34911 (R:US)
Polarization
Implications of polarized DT plasmas for toroidal fusion reactors, 8:34934 (R:US)

THERMONUCLEAR IGNITION
Computer Codes
SSBAPAC user manual, 8:34925 (R:US)

THERMONUCLEAR REACTOR WALLS
See also FIRST WALL
Design
Wall tritium contamination as a factor in fusion-reactor wall design, 8:34918 (R:US)

THERMONUCLEAR REACTORS
For use in cases where certain aspects of either hypothetical or real thermonuclear reactors are discussed.
See also LASER FUSION REACTORS
MAGNETIC MIRROR TYPE REACTORS
TOKAMAK TYPE REACTORS
Beam Injection Heating
Negative ion formation and neutralization processes, (I). Related to plasma heating by 'negative ion based neutral beam injection', 8:34899 (R:JP:In Japanese)
Design
Design considerations for direct-illumination-driven inertial-fusion reactors, 8:34948 (R:US)
Economics
Modeling and analysis of inertial-confinement-fusion facilities, 8:34931 (R:US)
Fluidized Bed
Fluidized-bed design for ICF reactor blankets using solid-lithium compounds, 8:34914 (R:US)
Meetings
Fifth topical meeting on the technology of fusion energy, 8:34924 (R:US)
National Program Plans
Magnetic-fusion program, 8:34893 (R:US)
Nuclear Reactions
Applied uses of nuclear level densities, 8:34824 (R:US)
Power Generation
Modeling and analysis of inertial-confinement-fusion facilities, 8:34931 (R:US)

THIOSORBIC PROCESS
Performance
Proven reagent for high sulfur coal flue gas desulfurization, 8:33053 (RA:US)

THORACIC DUCT
See LYMPH VESSELS

THORIUM D
See LEAD 208

THORIUM-HOCHTEMPERATUR PROTOTYPE REACTOR
See THTR-300 REACTOR

THREE MILE ISLAND-1 REACTOR
Reactor Materials
Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R:US)
Steam Generators
Evaluation of SCC test methods for Inconel 600 in low temperature aqueous solutions, 8:33668 (R:US)

THREE MILE ISLAND-2 REACTOR
Activity Levels
Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R:US)
Radiation Hazards
Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R:US)
Reactor Accidents
Three Mile Island, 8:33775 (J:US)
Repair
Estimated source terms for radionuclides and suspended particulates during TMI-2 defueling operations Phase II. Volume II, 8:33744 (R:US)
Shock Absorbers
Examination of mechanical snubbers from TMI-2. Final report, 8:33743 (R:US)

THRESHOLD DETECTORS
^{127}I(n,2n)^{126}I reaction as a fast neutron flux monitor, 8:34380 (J:US)

THROMBOCYTES
See BLOOD PLATELETS

THTR-300 REACTOR
Operation
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
Planning
HTR potentialities and their possible interaction with production of gas, heat and electricity, 8:33706 (R:BE:In German)
Reviews
Business report 1980 of the HKG, 8:34464 (R:DE:In German)

THULIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Distribution Functions
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
Solvent Extraction
Activity coefficients of bis(2-ethylhexyl) phosphoric acid in n-dodecane, 8:34076 (J:GB)
THULIUM 169
Moessbauer Effect
Conversion electron Moessbauer spectroscopy of europium-151 and thulium-169, 8:34832 (J:GB)
THUNDERBIRD PROJECT
In-situ gasification of coal following nuclear fragmentation.
Project Thunderbird: a nuclear trigger for coal gasification, 8:33011 (J:US)
THYROID STIMULATING HORMONE
See TSH
THYROXINE
Biochemistry
Thyroid hormone studies after ozone exposure, 8:34618 (RA:US)
TIGHT SANDS
See SANDSTONES
TIGLIUM OIL
See CROTON OIL
TIME MEASUREMENT
Algorithms
Clock error models for simulation and estimation, 8:34963 (R:US)
Errors
Clock error models for simulation and estimation, 8:34963 (R:US)
TIN 112 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, ^{106,114}Cd, ^{120}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)
TIN BASE ALLOYS
Casting
Modeling of continuous strip production by rheocasting, 8:33993 (J:US)
TITANIUM
Corrosion
Electrochemical behavior of titanium, 8:34174 (J:US)
Electrochemistry
Electrochemical behavior of titanium, 8:34174 (J:US)
TITANIUM BORIDES
Wear
Low-speed sliding damage in TiB_2-Ni composites, 8:34009 (R:US)
TITANIUM COMPLEXES
Chemical Preparation
Preparation and reaction of metal ketene complexes of Zr and Ti, 8:34096 (J:US)
TITANIUM OXIDES
Cryogenics
Thermoelectric refrigeration for temperatures below 100 K: A study of titanium sesquioxide, 8:33998 (R:US)
Electric Conductivity
Thermoelectric refrigeration for temperatures below 100 K: A study of titanium sesquioxide, 8:33998 (R:US)
Thermal Conductivity
Thermoelectric refrigeration for temperatures below 100 K: A study of titanium sesquioxide, 8:33998 (R:US)
TITANIUM SULFIDES
Entropy
Cluster-variation method for the triangular lattice gas, 8:34105 (J:GB)
Phase Diagrams
Cluster-variation method for the triangular lattice gas, 8:34105 (J:GB)
TITRATION
Comparative Evaluations
Colorimetric and titrimetric quantitation of ammonia in oil shale wastewater, 8:33172 (RA:US)
Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters, 8:33173 (RA:US)
TLD (DOSEMETERS)
See THERMOLUMINESCENT DOSEMETERS
TLD SYSTEMS
See THERMOLUMINESCENT DOSEMETERS
TMPN
See HYDROXY COMPOUNDS
ORGANIC OXYGEN COMPOUNDS
TMX DEVICES
Magnet Coils
Magnetic-coil optimization for quadrupole-stabilized mirror systems, 8:34938 (R:US)
Research Programs
Mirror fusion. Quarterly report, July-September 1982, 8:34944 (R:US)
TOBACCO SMOKES
Chemical Composition
Chemical characterization of the smokes of selected US commercial cigarettes: tar, nicotine, carbon monoxide, oxides of nitrogen, hydrogen cyanide, and acrolein (32 brands), 8:34402 (R:US)
TOKAMAK DEVICES
ICR Heating
Modeling of ICRF heating of a tokamak plasma, 8:34903 (R:US)
Impurities
Charge state of sputtered impurity ions near a limiter or divertor in a tokamak, 8:34909 (R:US)
Ion Density
Non-Maxwellian ion distributions caused by neoclassical heat conduction, 8:34894 (R:US)
Kink Instability
Reduced equations for internal kinks in tokamaks, 8:34907 (R:US)
Plasma Sheath
Axisymmetric scrape-off plasma transport, 8:34937 (R:US)
RF Systems
Resonant-cavity ICRF coupler for large tokamaks, 8:34936 (R:US)
TOKAMAK FUSION TEST REACTOR
See TFTR REACTORS
TOKAMAK TYPE REACTORS
See also DOUBLET REACTORS
INTOR TOKAMAK
ISX TOKAMAK
STARFIRE TOKAMAK
TFTR REACTORS
Breeding Blankets
Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R:US)
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
Current-Drive Heating
High-energy tritium beams as current drivers in tokamak reactors, 8:34904 (R:US)
Design
Demonstration tokamak power plant, 8:34921 (R:US)
First Wall
Overview of first wall/blanket/shield technology, 8:34915 (R:US)
Lifetime
Lifetime analysis of fusion-reactor components, 8:34919 (R:US)
Limiters
Electromagnetic effects on the FED/INTOR limiter, 8:34920 (R:US)
Neutral Atom Beam Injection
High-energy tritium beams as current drivers in tokamak reactors, 8:34904 (R:US)
Radiation Hazards
Effects of tritium contamination in the FED/INTOR reactor hall, 8:34916 (R:US)
Shielding
Overview of first wall/blanket/shield technology, 8:34915 (R:US)

Thermonuclear Fuels
Implications of polarized DT plasmas for toroidal fusion reactors, 8:34934 (R:US)
TOMOGRAPHY
Images
Limited-angle problem in tomography and some related mathematical problems, 8:34962 (R:US)
TOTAL-ABSORPTION SPECTROMETERS
See SHOWER COUNTERS
TOWERS (EXTRACTION)
See EXTRACTION COLUMNS
TOXIC MATERIALS
Combustion
Environmental impacts of proposed toxic substances incinerator, 8:34254 (RA:US)
Environmental Exposure Pathway
Toxic substances program, 8:34453 (RA:US)
Environmeatal Impacts
Toxic substances program, 8:34453 (RA:US)
Research Programs
Environmental Sciences Division annual progress report for period ending September 30, 1982. Environmental Sciences Division Publication No. 2090 (Lead abstract), 8:34400 (R:US)
Transport
Allowable shipment frequencies for the transport of toxic gases near nuclear power plants, 8:33757 (R:US)
TRACK DETECTORS (DIELECTRIC)
See DIELECTRIC TRACK DETECTORS
TRACKS
See PARTICLE TRACKS
TRANSAMINASES
See AMINOTRANSFERASES
TRANSCRIPTION
Biochemical Reaction Kinetics
Chronon theory of circadian rhythm control, 8:34570 (BA:US)
TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
TRANSFORMATIONS (ONCOGENIC)
See ONCOGENIC TRANSFORMATIONS
TRANSFORMATIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSFORMERS
See also GAS-INSULATED TRANSFORMERS
Technology Assessment
X-ray emission of high voltage vacuum devices, 8:34517 (R:DE:In German)
TRANSIENTS
Hydraulics
Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982, 8:33742 (R:US)
Pressure Gradients
Final report on the study of the effect of primary and secondary plant parameters on light-water-reactor transient behavior. Progress report, July 1-December 31, 1982, 8:33742 (R:US)
TRANSITION ELEMENT COMPLEXES
See also COBALT COMPLEXES
COPPER COMPLEXES
IRIDIUM COMPLEXES
IRON COMPLEXES
NICKEL COMPLEXES
PLATINUM COMPLEXES
RHODIUM COMPLEXES
RUTHENIUM COMPLEXES
TITANIUM COMPLEXES
ZIRCONIUM COMPLEXES
Catalytic Effects
Comprehensive mechanism for the Fischer-Tropsch synthesis, 8:34170 (J:US)
TRANSITIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSMISSION LINES
See POWER TRANSMISSION LINES
TRANSPORT (NEUTRON)
See NEUTRON TRANSPORT
TRANSPORT THEORY
See also NEOCLASSICAL TRANSPORT THEORY
NEUTRON TRANSPORT THEORY
Analytical Solution
Bounds and maximum principles for the solution of the linear transport equation, 8:34857 (J:US)
TRANSPORTATION SYSTEMS
See also MASS TRANSIT SYSTEMS
RAPID TRANSIT SYSTEMS
Energy Conservation
Technology assessment of productive conservation in urban transportation. Final report, 8:33923 (R:US)
Energy Shortages
Evaluation of options for freight carriers during a fuel crisis, 8:33924 (R:US)
Planning
Evaluation of options for freight carriers during a fuel crisis, 8:33924 (R:US)
Technology Assessment
Technology assessment of productive conservation in urban transportation. Final report, 8:33923 (R:US)
TRANSURANIUM WASTES
See ALPHA-BEARING WASTES
TREES
See also PINES
POPLARS
Anatomy
Wood properties of salix caprea and salix pentandra, 8:33334 (R:SE:In Swedish)
Cultivation
Energy forestry in the north of Sweden, 8:33336 (R:SE:In Swedish)
Measuring Methods
Wood qualities and measurement of whole tree, 8:33342 (R:SE:In Swedish)
Short Rotation Cultivation
Wood properties of salix caprea and salix pentandra, 8:33334 (R:SE:In Swedish)
TRETAMINE
See ALKYLATING AGENTS
TRIETHYLENEMELAMINE
See ALKYLATING AGENTS
TRIPHENYLENE
Gas Chromatography
Fabrication of gas-chromatographic glass capillary columns of high efficiency with liquid crystal stationary phases (Separation of polycyclic aromatic hydrocarbons), 8:34086 (J:DE)
TRIPLET PARTICLES
See QUARKS
TRITICUM
See WHEAT
TRITIUM
Effects of tritium in elastomers, 8:34015 (R:US)
Breeding
Assessments of tritium-breeding requirements and breeding potential for the STARFIRE/DEMO design, 8:34923 (R:US)
Environmental Exposure Pathway
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Environmental Transport
Investigation of the consequences of leakage incidents of a tank with high-concentrated radionuclide solutions and pentration of the radioactive solution into the soil, 8:34426 (R:DE:In German)
Radiation Hazards
Effects of tritium contamination in the FED/INTOR reactor hall, 8:34916 (R:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Foodstuffs, 8:34427 (RA:US)
TROMBE WALLS
Computerized Simulation
Trombe wall test and simulation, 8:33438 (J:US)

Construction
Solar retrofit of Vintage Auto Parts, Woodinville, WA, 8:33498 (J:US)
Design
Obermeyer headquarters and warehouse, 8:33497 (J:US)
Solar retrofit of Vintage Auto Parts, Woodinville, WA, 8:33498 (J:US)
Performance Testing
Trombe wall test and simulation, 8:33438 (J:US)
Retrofitting
Solarization and weatherization of a turn-of-the-century brick row house, 8:33529 (J:US)
Wood Burning Furnaces
Integrated passive solar and wood design for the Pacific Northwest, 8:33514 (J:US)

TRONA
Comparative Evaluations
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)
Sorptive Properties
Demonstration of SO_2 removal on a coal-fired boiler by injection of dry sodium compounds, 8:33047 (RA:US)

TRU WASTES
See ALPHA-BEARING WASTES

TRX-1
See REVERSE-FIELD PINCH

TSH
Biochemistry
Thyroid hormone studies after ozone exposure, 8:34618 (RA:US)

TUBES
For objects of tubular shape; not for DRIFT TUBES, ELECTRON TUBES or IMAGE STORAGE TUBES.
See also PRESSURE TUBES
Composite Materials
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)
Corrosion Resistance
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)
Fabrication
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)
Fatigue
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
Materials Testing
Thermal-mechanical fatigue-test apparatus for solar-receiver tubing, 8:33365 (R:US)
Mechanical Properties
Application of composite heat transfer tubes in power plants, 8:33975 (J:US)
Supports
Helical bundle heat exchanger support plate nonlinear vertical gradient thermal stress analysis (HTGR), 8:33682 (R:US)

TUBES (CONDUITS)
See PIPES

TUFF
Deformation
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)
Thermal Stresses
MATLOC: a two-dimensional and axisymmetric nonlinear finite-element transient thermal-stress-analysis code for rock masses that exhibit bilinear locking behavior, 8:34672 (R:US)

TUMOR CELLS
Morphology
Expectation values for low-resolution slit-scan flow prescreening: influence of nuclear shape and DNA density, 8:34556 (J:US)
Population Dynamics
Cell age distribution in multicell tumor spheroids, 8:34596 (RA:US)

TUMOR PROMOTERS
Biological Pathways
Multistage skin tumor promotion: involvement of a protein kinase, 8:34645 (BA:US)

TUMOR VIRUSES
See ONCOGENIC VIRUSES

TUMORS
See NEOPLASMS

TUNGSTEN
Sorptive Properties
Monte Carlo study of diffusion in a model of an ordered absorbate, 8:34136 (J:GB)

TUNGSTEN 184 TARGET
Neutron Reactions
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{176}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J:US)

TUNGSTEN ALLOYS
See also INCONEL 718
Annealing
Annealing studies of amorphous alloys, 8:34247 (R:US)

TUNGSTEN COMPOUNDS
Chemical Reaction Kinetics
Kinetic studies of the reactions of the carbene complex $W(CO)_5[C(SCH_3)_2]$ with phosphines to form phosphorane complexes $W(CO)_5[(CH_3S)_2C{=}{=}PR_3]$ and the synthesis of some cyclic phosphorane complexes, 8:34107 (J:NL)
Chemical Reactions
Activation of chemical reaction by impact of molecules on a surface, 8:34161 (J:US)

TUNGSTEN IONS
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)

TURBINE BLADES
Erosion
Effect of PFBC particulate on the high velocity erosion-corrosion of gas turbine materials, 8:33007 (BA:US)
Erosion behavior of materials in multiphase flows, 8:33980 (BA:US)
Erosion/corrosion of turbine blades in coal combustion products, 8:33094 (BA:US)
Risk Assessment
Safety of wind energy conversion systems with horizontal axis (HA WECS), 8:33607 (R:SE)
Stresses
Calculation of blade-data for the Hamilton standard structural analysis of the composite blade for the 18 meter diameter rotor and a comparison with FFA-calculation, 8:33605 (R:SE)
Testing
Evaluation of tests and calculation on glass-fiber reinforced wind turbine blade 1 and 2 manufactured by Karlskronavarvet, 8:33606 (R:SE)
Wind Loads
General method for fatigue analysis of vertical-axis wind-turbine blades, 8:33613 (R:US)

TURBINES
See also GAS TURBINES
STEAM TURBINES
WIND TURBINES
Power Generation
Development of the biphase turbine for waste-heat conservation. Final report, 8:33934 (R:US)
Waste Heat Utilization
Development of the biphase turbine for waste-heat conservation. Final report, 8:33934 (R:US)

TURBOMACHINERY
See also TURBINES
Turbulent Flow
Generation of higher levels of turbulence in the test section of the High Speed Cascade Wind Tunnel Braunschweig for simulation of turbomachinery conditions, 8:34217 (R:DE:In German)

TURKEY
Energy Policy
Turkey - energy situation 1981, 8:33836 (R:DE:In German)
Energy Supplies
Turkey - energy situation 1981, 8:33836 (R:DE:In German)

TWO-PHASE FLOW
Momentum Transfer
Study of momentum transfer in two-fluid formulation of two-phase flow, 8:34230 (R:US)
TWO-STREAM INSTABILITY
Numerical Solution
Numerical simulation of echo phenomena in plasma, 8:34895 (R:DE:In German)

U

U-1 GROUPS
Gauge Invariance
Gauge unification of fundamental forces, 8:34779 (RA:BR)
UCLLL
See LAWRENCE LIVERMORE LABORATORY
UGANDA
Energy Policy
Uganda - energy situation 1981, 8:33833 (R:DE:In German)
Energy Supplies
Uganda - energy situation 1981, 8:33833 (R:DE:In German)
ULTRACENTRIFUGES
Calibration
Calibration of the analytic ultracentrifuge, 8:34057 (RA:US)
ULTRAVIOLET RADIATION
Biological Radiation Effects
Biological effects of UV-B radiation, 8:34575 (R:DE)
Carcinogenesis
Dose-time relationship for UV-tumorigenesis, 8:34663 (RA:DE)
UV action spectra for mammalian systems: their implications for the predicted effects of ozone depletion of skin cancer incidence, 8:34576 (RA:DE)
Dosimetry
Choice of the normalization wavelength for action spectra in polychromatic radiation dosimetry of UV-B, 8:34577 (RA:DE)
ULTRAVIOLET SPECTROMETERS
Comparative Evaluations
Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA:US)
Design
Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA:US)
UNCERTAINTY
See DATA COVARIANCES
UNDERGROUND BUILDINGS
See EARTH-COVERED BUILDINGS
UNDERGROUND DISPOSAL
Performance
New hydrofracture facility at ORNL, 8:33194 (RA:US)
Radiation Hazards
Computerized methodology for evaluating the long-range radiological impact of shallow-land burial, 8:33195 (RA:US)
UNDERGROUND GASIFICATION
See IN-SITU GASIFICATION
UNDERGROUND HEAT DISTRIBUTION SYSTEMS
See HEAT DISTRIBUTION SYSTEMS
UNDERGROUND MINING
Ground Motion
Influence of soil movement caused by mining activities on location, new construction and structural state of public roads in the bituminous coal districts of the Federal Republic of Germany, 8:33065 (R:DE:In German)
Safety Engineering
VG annual report 1981 (Tremonia, Federal Republic of Germany), 8:33099 (R:DE:In German)
UNDERGROUND NUCLEAR POWER PLANTS
See UNDERGROUND NUCLEAR STATIONS
UNDERGROUND NUCLEAR STATIONS
Feasibility Studies
Collection of arguments for and against the construction of Fast Breeder Reactors in underground nuclear facilities, 8:34471 (R:DE:In German)
UNDERGROUND SPACE
Power Distribution Systems
New tools to cut labor costs, 8:33661 (J:US)
UNIFIED GAUGE MODELS
Gauge fields and unifying ideas, 8:34778 (RA:BR)
Flavor Model
Natural embedding of Peccei-Quinn symmetry in flavor grand unification, 8:34774 (R:XA)
Lie Groups
New approach to unified field theories, 8:34769 (R:XA)
SU-6 Groups
Reason for SU(6) grand unification, 8:34775 (R:XA)
Supersymmetry
N-anti N oscillation in SO(10) and SU(6) supersymmetric grand unified models, 8:34776 (R:XA)
U-1 Groups
Natural embedding of Peccei-Quinn symmetry in flavor grand unification, 8:34774 (R:XA)
UNIFIED-FIELD THEORIES
Prior to March 1983 this concept was indexed to EINSTEIN-SCHROEDINGER THEORY or UNIFIED GAUGE MODELS.
See also SUPERGRAVITY
Gauge fields and unifying ideas, 8:34778 (RA:BR)
Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R:US)
Second Z in SO(10), 8:34766 (R:US)
Symmetry Breaking
B-L violating supersymmetric couplings, 8:34765 (R:US)
UNITED KINGDOM
Productivity
Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R:US)
PWR Type Reactors
Sizewell B - analysis of British application of US PWR technology, 8:33753 (R:US)
UNITED STATES OF AMERICA
See USA
UNIVERSE
Scalar Fields
Low energy behavior of a quantized scalar field in the linearly expanding universe, 8:34786 (R:JP)
URANIUM
Adsorption
Waste form/rock interaction leaching study using PNL 76-68 glass beads and Umtanum basalt. Part I, 8:33234 (R:US)
Complexes
Literature review of interaction of oxidized uranium species and uranium complexes with soluble organic matter, 8:34678 (R:US)
Geochemistry
Literature review of interaction of oxidized uranium species and uranium complexes with soluble organic matter, 8:34678 (R:US)
Ion Emission
Simple method to enhance thermal emission of metal ions, 8:34074 (J:NL)
Material Balance
Evaluation of alternatives for treatment of PGDP steam plant fly ash, 8:33018 (RA:US)
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)
Soil and vegetation, 8:34429 (RA:US)
URANIUM 233 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)

URANIUM 234 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
URANIUM 235 TARGET
Neutron Reactions
^{235}U (n,f) cross section measurements and normalization problems, 8:34842 (J:US)
Absolute measurement of the U-235 fission cross section from 0.2 - 1.2 MeV, 8:34843 (J:US)
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J:US)
Measurement of U-235 absolute alpha value in the neutron energy range from 0.1 to 30 keV, 8:34837 (J:US)
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
Spectrometry of multiplicity of secondary radiation as a method of measurement of neutron cross-section and investigation of nuclei, 8:34796 (J:US)
Transmission and self-indication measurements with U-235 and Pu-239 in the 2 eV-20 keV energy region, 8:34839 (J:US)
URANIUM 236 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
URANIUM 238
Resonance Integrals
Sensitivity of computed integral parameters to the neutron width of the lowest U-238 resonance, 8:33720 (RA:IL)
URANIUM 238 TARGET
Neutron Reactions
Absolute measurements of induced fission cross sections of heavy nuclides for both ^{252}Cf fission spectrum neutrons and 14.7 - MeV neutrons, 8:34845 (J:US)
Application of a time-correlated associated particle method for absolute cross-section measurements of heavy nuclides, 8:34844 (J:US)
Perturbations of nuclear cross sections associated with changes in molecular vibrational energy, 8:34836 (J:US)
Simultaneous evaluation of the nuclear data for heavy nuclides, 8:34840 (J:US)
URANIUM BASE ALLOYS
Electron Beam Welding
Computer programs for calculating thermal distribution on uranium-6 weight percent niobium alloy during electron-beam welding, 8:33974 (R:US)
URANIUM CARBIDES
Physical Radiation Effects
Status of steady-state irradiation testing of mixed-carbide fuel designs, 8:33689 (R:US)
URANIUM COMPOUNDS
See also URANIUM CARBIDES
URANIUM HYDRIDES
URANIUM NITRATES
Chemical Preparation
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)
Crystal Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)
Molecular Structure
Synthesis and structure of dicyclopentenouranocene $U[C_5H_5(CH_3)_3]_2$, 8:34207 (J:US)
URANIUM DEPOSITS
Exploration
Legal aspects of search and mining of nuclear ores under Brazilian law, 8:33850 (B:BR:In Portuguese)
Geology
Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R:US)
Origin
Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R:US)
Prospecting
Geology of the uranium prospect at Camp Smith, New York with a new model for the formation of uranium deposits in metamorphosed submarine volcanogenic rocks, 8:33178 (R:US)
National Uranium Resource Evaluation: intermediate-grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado, 8:33176 (R:US)
URANIUM DIOXIDE
Binding Energy
XPS evidence for 5f bonding participation in UO_2, 8:33991 (J:NL)
Catalytic Effects
Further developments in the nickel/uranium/α-alumina catalyst system, 8:33141 (J:GB)
Electronic Structure
XPS evidence for 5f bonding participation in UO_2, 8:33991 (J:NL)
URANIUM HYDRIDES
Electronic Structure
Electronic energy band structure of UH_3, 8:34000 (J:CH)
URANIUM IONS
Ion-Atom Collisions
Recoil ions: production and uses, 8:34713 (RA:US)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
URANIUM ISOTOPES
See also URANIUM 238
Isotope Separation
Generalized computer model of the transient behavior of multicomponent isotope separation cascades, 8:33180 (J:US)
URANIUM MINES
Land Reclamation
Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R:US)
Management
Review of uranium spoil and mill tailings revegetation in the western United States. Forest Service general technical report (final), 8:33243 (R:US)
URANIUM NITRATES
Oxidation
Testing and economical evaluation of U(IV) in Purex, 8:33183 (R:US)
Production
Testing and economical evaluation of U(IV) in Purex, 8:33183 (R:US)
URANIUM ORES
Dusts
NRC's limit on intake of uranium-ore dust, 8:33247 (R:US)
Mining
Legal aspects of search and mining of nuclear ores under Brazilian law, 8:33850 (B:BR:In Portuguese)
Safety Standards
NRC's limit on intake of uranium-ore dust, 8:33247 (R:US)
Toxicity
Health Hazards Evaluation Report No. HETA-81-055-954, Cotter Corporation, Canon City, Colorado, 8:34603 (R:US)
URBAN AREAS
Energy Conservation
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
Solar Heating Systems
Residential solar retrofit and energy conservation potential in an urban area, 8:33481 (J:US)
US DOE
See also ANL
BARTLESVILLE ENERGY TECHNOLOGY CENTER
BATTELLE PACIFIC NORTHWEST LABORATORIES
BNL
ENERGY INFORMATION ADMINISTRATION
HANFORD RESERVATION

HAPO
IDAHO CHEMICAL PROCESSING PLANT
LASL
LAWRENCE LIVERMORE LABORATORY
MORGANTOWN ENERGY TECHNOLOGY CENTER
ORGDP
PADUCAH PLANT
SANDIA LABORATORIES
SAVANNAH RIVER PLANT
US DOE INSPECTOR GENERAL
Report to Congress on the Small-Business Program of the Department of Energy, 8:33795 (R:US)
Personnel Management
Sick leave administration, 8:33787 (R:US)
Research Programs
Federal energy R and D priorities: report of the Energy Research Advisory Board, 8:33808 (R:US)
Summary of University contracts and grants supported by Office of Fossil Energy, FY 82, 8:32954 (R:US)
Summary of AR and TD/APT contracts and grants supported by Office of Fossil Energy, FY 1982, 8:32955 (R:US)
US DOE INSPECTOR GENERAL
Audits
Office of Inspector General FY 1983 semiannual report, October 1, 1982-March 31, 1983, 8:33785 (R:US)
US EPA
Pollution Regulations
Continuous emission monitoring of flue gas desulfurization systems, 8:34398 (RA:US)
Research Programs
SO_2 control with limestone in low NO/sub x/ systems: development status, 8:33050 (RA:US)
US NRC
United States Nuclear Regulatory Commission-prior to 1975 was part of US AEC.
Nuclear Facilities
NRC Incident-Response Plan, 8:33751 (R:US)
NRC Regulatory Agenda. Quarterly report, January-February 1983. Vol. 2, No. 1, 8:33697 (R:US)
US WATER POLLUTION CONTROL ACT
See CLEAN WATER ACT
USA
See also APPALACHIA
FEDERAL REGION V
FEDERAL REGION VII
WASHINGTON DC
Coal Deposits
Assessment of underground coal gasification in bituminous coals, 8:32974 (RA:US)
Coordinated Research Programs
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
Electric Utilities
Review of energy-supply-decision issues in the US electric utility industry, 8:33867 (R:US)
Energy Consumption
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)
Fuel Consumption
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)
Nuclear Power Plants
Licensee Event Report (LER) compilation for month of April 1983, 8:33755 (R:US)
Nuclear reactor safety in the USA, 8:33749 (R:US)
Regulatory licensing status summary report. Nuclear power plants, data for decisions (blue book), April 1-April 30, 1983. Volume 12, No. 4, 8:33695 (R:US)
Productivity
Industrial relations and uneven development: wage structure and industrial organization in the British and US iron and steel industries 1870-1970. Doctoral thesis (final), 8:33799 (R:US)
Radiation Monitoring
Environmental radiation data: report 23-24. Report for July-December 1980, 8:34417 (R:US)
UTAH
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
UTERINE CERVIX CARCINOMA
See CARCINOMAS
UTILITIES
See ELECTRIC UTILITIES

V

VAGINA
See FEMALE GENITALS
VALENCE ELECTRONS
See ELECTRONS
VAN DE GRAAFF ACCELERATORS
See also CRNL MP TANDEM ACCELERATOR
Beam Optics
Bremsstrahlung characteristics and particle trajectories in inclined field tubes of alternating or spiraling transverse fields, 8:34276 (BA:US)
Choice of field patterns of the straight field accelerating tube and its optic characteristics, 8:34295 (BA:US)
Electric Fields
Bremsstrahlung characteristics and particle trajectories in inclined field tubes of alternating or spiraling transverse fields, 8:34276 (BA:US)
Choice of field patterns of the straight field accelerating tube and its optic characteristics, 8:34295 (BA:US)
Electric Sparks
Prebreakdown and breakdown processes in high vacuum accelerator tubes, 8:34336 (BA:US)
Electrical Insulators
Development of high gradient, high vacuum accelerator tubes at Daresbury, 8:34274 (BA:US)
Electrodes
Development of high gradient, high vacuum accelerator tubes at Daresbury, 8:34274 (BA:US)
VANADIUM
Biological Effects
Relationship of vanadium, cadmium, lead, nickel, cobalt, and soft water to myocardial and vascular toxicity and cardiovascular disease, 8:34643 (BA:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
VANADIUM ALLOYS
After-Heat
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
Radioactivation
Influence of steel type on the activation and decay of fusion-reactor first walls, 8:34947 (R:US)
VANADIUM BROMIDES
Pyrolysis
Thermal decomposition of trans-dibromotetraquovanadium(III) bromide, $[VBr_2(H_2O)_4]Br.2H_2O$, 8:34108 (J:CH)

VANADIUM MINERALS
See MINERALS
VANPOOLING
Economic Analysis
Vanpooling for profit: a business opportunity, 8:33925 (R:US)
VAPOR PRESSURE
Temperature Dependence
Isopiestic studies of aqueous solutions at elevated temperatures. III. [(1-y)NaCl + yCaCl$_2$], 8:34139 (J:GB)
VARIABLE ENERGY CYCLOTRONS
Modifications
Design parameters of a multipurpose cyclotron, 8:34267 (RA:SU:In Russian)
VEGETABLES
Edible parts of plants only; see also FRUITS.
See also BEANS
CUCUMBERS
RADISHES
SOYBEANS
SPINACH
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
VEGETATION
See PLANTS
VENEZUELA
Coordinated Research Programs
Enhanced-oil-recovery thermal processes, annex IV. Venezuela-MEM/USA-DOE fossil-energy report IV-1, 8:33131 (R:US)
Evaluate past and ongoing enhanced oil-recovery projects in the United States and Venezuela, annex III. Venezuela-MEM/USA-DOE fossil-energy report III-1, 8:33130 (R:US)
Residual oil saturation, Annex VI-1. Venezuela-MEM/USA-DOE fossil energy report VI-1, 8:33133 (R:US)
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
VENTILATION
Ventilation by stratification and displacement, 8:33895 (R:US)
VENTILATION DUCTS
See DUCTS
VENTILATION
VENTILATION SYSTEMS
Air Quality
Ventilation by stratification and displacement, 8:33895 (R:US)
Evaluation
Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982, 8:33077 (R:US)
Failure Mode Analysis
Risk assessment of filtered-vented containment options for a BWR Mark I containment, 8:33774 (BA:US)
Remote Control
Evaluation of a combined face ventilation system used with a remotely operated mining machine. Information circular/1982, 8:33077 (R:US)
Risk Assessment
Risk assessment of filtered-vented containment options for a BWR Mark I containment, 8:33774 (BA:US)
VERMONT
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
VERTICAL AXIS TURBINES
Electric Generators
Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems, 8:33611 (R:US)
Rotors
Analytical and experimental investigation of a wound-rotor variable-speed, constant-frequency generator for small wind energy systems, 8:33611 (R:US)
Turbine Blades
General method for fatigue analysis of vertical-axis wind-turbine blades, 8:33613 (R:US)
VESSELS
See CONTAINERS
VESSELS (CHEMICAL REACTIONS)
See CHEMICAL REACTORS
VESSELS (PRESSURE)
See PRESSURE VESSELS
VESSELS (REACTOR)
See REACTOR VESSELS
VIBRATIONS (MECHANICAL)
See MECHANICAL VIBRATIONS
VICKSI
Van de Graaff-Isochronous Cyclotron Combination Heavy Ion Facility at the Hahn-Meitner Institute, Berlin.
Performance
VICKSI-operating experience and future plans, 8:34335 (BA:US)
VINYLBENZENE
See STYRENE
VIRGINIA
Black Shales
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Fuel Fabrication Plants
Environmental impact appraisal for renewal of Special Nuclear Material License No. SNM-1168. Docket No. 70-1201, 8:33181 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Natural Gas Deposits
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
VIRUSES
See also BACTERIOPHAGES
ONCOGENIC VIRUSES
DNA
Radiation-induced leukemogenesis in RFM/UN strain mice: a potential model for retrovirus sequence transposition (X-rays), 8:34606 (BA:US)
Stimulation
Induction of retrovirus gene expression in mouse cells by some chemical mutagens, 8:34636 (J:US)
VISION
Pigments
Reciprocal effects of an inhibitory factor on catalytic activity and noncatalytic cGMP binding sites of rod phosphodiesterase, 8:34488 (J:US)
VISITOR CENTERS
See PUBLIC BUILDINGS
VITAMIN B-6
See PYRIDOXINE
VITAMIN H-1
See PABA
VOLTAIC CELLS
See ELECTRIC BATTERIES

W

WALLS
See also TROMBE WALLS

Design
Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures, 8:33179 (R:US)
Performance Testing
Special Isotope Separation Laboratory (SISL): structural and thermal analyses and design for laser-support structures, 8:33179 (R:US)
Thermal Mass
Thermal mass in a hot-humid climate, 8:33532 (J:US)
Thermal Stresses
Simple method for evaluation of the maximum thermal residual stresses in multi-layer external structural members, 8:33897 (R:DE:In German)

WASHINGTON
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
Solar Access
Solar siting and access protection in new development, 8:33312 (J:US)

WASHINGTON DC
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)

WASTE BURIAL
See UNDERGROUND DISPOSAL

WASTE DISPOSAL
See also GROUND DISPOSAL
RADIOACTIVE WASTE DISPOSAL
SANITARY LANDFILLS
UNDERGROUND DISPOSAL
Environmental Impacts
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Evaluation
Characterization and environmental evaluation of full-scale utility waste disposal sites, 8:33061 (RA:US)
Monitoring
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)
Recommendations
Hazardous waste management alternatives utilized at the PGDP, 8:33192 (RA:US)
Research Programs
Summary of EPRI FGD sludge disposal research, 8:33042 (RA:US)

WASTE OILS
Waste Management
Polychlorinated biphenyl chemical destruction processes, 8:33150 (RA:US)

WASTE PROCESSING
See also RADIOACTIVE WASTE PROCESSING
Feasibility Studies
Solvent extraction of polychlorinated biphenpyl, 8:33149 (RA:US)

WASTE PROCESSING PLANTS
See also RESOURCE RECOVERY FACILITIES
Cost Benefit Analysis
How much is a biogas system to cost. Operational evaluation of biogas in agriculture, 8:33348 (R:DK:In Danish)
Design
Biodegradation of chemical plant wastewater containing dimethylformamide, 8:34253 (R:US)

WASTE TREATMENT
See WASTE PROCESSING

WASTE WATER
Biomass
Microbial biomass in oil shale wastewaters: quantitation as protein, 8:33174 (RA:US)
Chemical Oxygen Demand
Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters, 8:33173 (RA:US)
Chromatography
Rapid fractionation of oil shale wastewaters by reverse-phase separation, 8:33170 (RA:US)
Demetallization
Technique for the purification of metal containing mining waters. Literature survey, 8:33056 (R:SE:In Swedish)
Fractionation
Rapid fractionation of oil shale wastewaters by reverse-phase separation, 8:33170 (RA:US)
Purification
Technique for the purification of metal containing mining waters. Literature survey, 8:33056 (R:SE:In Swedish)
Quantitative Chemical Analysis
Colorimetric and titrimetric quantitation of chemical oxygen demand in oil shale wastewaters, 8:33173 (RA:US)
Coulometric quantitation of carbon in oil shale wastewaters: via uv-peroxydisulfate or high-temperature oxidation, 8:33171 (RA:US)
Quantitation of oil shale wastewater quality. A manual of analytical methods (Lead Abstract), 8:33175 (R:US)
Research Programs
Quantitation of oil shale wastewater quality. A manual of analytical methods (Lead Abstract), 8:33175 (R:US)
Simulation
Wet oxidation of phenol and naphthalene (as a surrogate PAH) in aqueous and sludge solution: application to coal-conversion wastewater and sludge treatment, 8:32960 (R:US)
Turbidity
Microbial biomass in oil shale wastewaters: quantitation as protein, 8:33174 (RA:US)
Uses
FGD chemistry and water integration, 8:33033 (RA:US)
Waste Processing
Treatment of waste water and sewage sludge - research promoted by the BMFT, 8:34588 (R:US)
Water Quality
Quantitation of oil shale wastewater quality. A manual of analytical methods (Lead Abstract), 8:33175 (R:US)
Water Treatment
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
FGD chemistry and water integration, 8:33033 (RA:US)
Process for removal of heavy-metal ions from waste water (Japanese patent), 8:33944 (TG:US)

WASTES
See also GASEOUS WASTES
MUNICIPAL WASTES
ORGANIC WASTES
RADIOACTIVE WASTES
SOLID WASTES
Gasification
Rationale for domestic synthetic fuel alternatives (Forecasting; 1980, 1990 and 2000; USA), 8:33098 (RA:US)

WATER
See also DRINKING WATER
GROUND WATER
HEAVY WATER
HOT WATER
SEAWATER
WASTE WATER
Binding Energy
Studies of the formation and structure of homomolecular and heteromolecular clusters, 8:34127 (J:NL)
Chemical Reaction Kinetics
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Dielectric Properties
Cavity boundary effects within the Onsager theory for dielectrics, 8:34125 (J:US)
Phase Transformations
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)
Photochemical Reactions
Photochemical energy conversion and solution kinetics, 8:34177 (R:US)

Radiolysis
Free radicals generated by radiolysis of aqueous solutions, 8:34201 (J:US)
Radiological physics and chemistry, 8:34195 (RA:US)
Study of the oxidation of graphite in liquid water for radioactive waste storage applications (Gamma radiation), 8:34046 (J:GB)
Raman Spectra
Concentration and temperature measurements in combustion measurements using Coherent AntiStokes Raman Scattering (CARS) spectroscopy, 8:34727 (R:US)
Thermodynamics
Algorithm for a modified Martin-Stanford equation of state, 8:34112 (J:GB)

WATER COOLANT
See WATER

WATER COOLED REACTORS
See also BWR TYPE REACTORS
HFIR REACTOR
LWBR TYPE REACTORS
PWR TYPE REACTORS
Coolant Cleanup Systems
Development of electromagnetic filter for removing suspended material from water circuit, 8:33725 (RA:CS:In Czech)
Purification of primary circuit coolant of light water reactor with Wofatit RH cation exchanger, 8:33676 (RA:CS:In Czech)

WATER GAS
Approximately 300 Btu/ft³
Chemical Reactions
Water gas shift reaction. II, 8:33272 (J:IN)
Water gas shift reaction. I, 8:33273 (J:IN)
Shift Processes
Water gas shift reaction. II, 8:33272 (J:IN)
Water gas shift reaction. I, 8:33273 (J:IN)

WATER GAS PROCESSES
Water gas shift reaction. I, 8:33273 (J:IN)

WATER MODERATOR
See WATER

WATER POLLUTION
Toxicity
Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report, 8:34455 (R:US)

WATER SOLUTIONS
See AQUEOUS SOLUTIONS

WATER SOURCE HEAT PUMPS
District Heating
Heat pump for waste water in Sala, Sweden, 8:33904 (R:SE:In Swedish)
Operating Cost
Sala 3.2 MW waste water heat pump measurements. Operation experiences. Report 1., 8:33903 (R:SE:In Swedish)
Specifications
Heat pump for waste water in Sala, Sweden, 8:33904 (R:SE:In Swedish)
Waste Heat Utilization
Heat pump for waste water in Sundsvall, (Sweden), 8:33905 (R:SE:In Swedish)

WATER TREATMENT
Adsorption
Adsorption equilibria between activated carbon and organic compounds in water studied in multicomponent systems of known and unknown composition, 8:34092 (R:DE:In German)
Chemical Analysis
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
Comparative Evaluations
Environmental-control technology survey of selected US strip-mining sites: water-quality impacts and overburden chemistry of Pennsylvania study sites, 8:33071 (R:US)
Environmental Impacts
Prediction of long-term impact of PGDP chromate sludge lagoon discharge, 8:34450 (RA:US)

WATER VAPOR
Thermal Conductivity
Study of vapor phase association in an acetic acid-water binary mixture by measurement of thermal conductivity and molecular orbital calculations, 8:34143 (BA:US)

WATER WAVES
Data Acquisition
Wave data from Swedish coastal waters 1979-80, 8:33580 (R:SE:In Swedish)
Hydrodynamics
Wave kinematics and fluid loading in irregular waves, 8:34679 (R:US)
Measuring Methods
Meeting on wave data for wave energy, 8:33581 (R:SE:In Norwegian and English)
Parametric Analysis
Wave motion in an estuary, 8:33578 (R:DE:In German)
Research Programs
Meeting on wave data for wave energy, 8:33581 (R:SE:In Norwegian and English)
Wave Propagation
Wave motion in an estuary, 8:33578 (R:DE:In German)

WATERBORNE PARTICLES
See PARTICULATES

WAVE ENERGY CONVERTERS
Computerized Simulation
Wave energy in the electric power system, 8:33584 (R:SE:In Swedish)
Electric Generators
Investigation of a new type of generators without rotor windings to be used for wave energy conversion, 8:33582 (R:SE:In Swedish)
Interconnected Power Systems
Wave energy in the electric power system, 8:33584 (R:SE:In Swedish)
Performance
Investigation of a new type of generators without rotor windings to be used for wave energy conversion, 8:33582 (R:SE:In Swedish)
Simulation
Wave power buoys. Model tests of energy absorption on irregular waves in a broad tank, 8:33579 (R:SE:In Swedish)

WAVE FORCES
Data Processing
Preliminary measurements of the waves at the Trubaduren lighthouse, 8:33583 (R:SE:In Swedish)

WAVE POWER
Measuring Methods
Meeting on wave data for wave energy, 8:33581 (R:SE:In Norwegian and English)

WAZ 16
See NICKEL BASE ALLOYS

WEAK INTERACTIONS
Lagrangian Field Theory
Weak interactions, 8:34760 (RA:BR)
Unified Gauge Models
Minimally extended elctroweak gauge theories in SO(10) and E_6, 8:34767 (R:US)

WEATHER
Research Programs
Radar meteorology in cloud physics and radio wave propagation research, 8:34394 (R:DE:In German)

WEATHERIZATION
Program Management
Peoria weatherization program, 8:33786 (R:US)

WECS
See WIND TURBINES

WELL DRILLING
Demonstration Programs
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R:US)
Drill Bits
Supporting technology for enhanced recovery, Annex V: evaluate application of recently developed techniques in the

areas of drilling, coring, and telemetry. Venezuela-MEM/USA-DOE fossil-energy report V-1, 8:33132 (R:US)
Research Programs
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology. Progress review No. 33, quarter ending December 31, 1982, 8:33127 (R:US)
WELLMAN-LORD PROCESS
See W-L SULFUR DIOXIDE RECOVERY PROCESS
WEST GERMANY
See FEDERAL REPUBLIC OF GERMANY
WEST VIRGINIA
Black Shales
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Natural Gas Deposits
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Vol. 1, 8:33166 (R:US)
Fractures in oriented Devonian-shale cores from the Appalachian Basin. Volume II. Appendices, 8:33167 (R:US)
Oil Fields
Abandoned oil fields in Alabama, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, New York, Tennessee and West Virginia, 8:33128 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)
WESTERN EUROPE
See also AUSTRIA
FEDERAL REPUBLIC OF GERMANY
FRANCE
IRELAND
LUXEMBOURG
SWITZERLAND
UNITED KINGDOM
Energy Analysis
Solar energy futures in a Western European context, 8:33824 (R:DE:In German)
Solar energy futures in a Western European context, 8:33825 (R:DE:In German)
WHEAT
Radionuclide Kinetics
Foodstuffs, 8:34427 (RA:US)
Radionuclide Migration
Foodstuffs, 8:34427 (RA:US)
Ultraviolet Radiation
Field trials with soybeans, rice and wheat under UV-B irradiances simulating several O_3 depletion levels, 8:34647 (RA:DE)
WILD ANIMALS
Radioecology
Wildlife, 8:34428 (RA:US)
WIND
Computer Codes
Improved diagnostic model for estimating wind energy, 8:33589 (R:US)
Computerized Simulation
Improved diagnostic model for estimating wind energy, 8:33589 (R:US)
Forecasting
Wind forecasting and some other aspects of wind information relevant to integration of WECS in the grid, 8:33596 (RA:DE)
Measuring Methods
Design and standardisation of meteorological measurements for wind energy converting systems, 8:33585 (R:DE:In German)
High time resolution wind data and the dynamic production function of WECS, 8:33586 (RA:DE)
Monitoring
Network for the measurement of wind energy at high masts, 8:33588 (R:SE:In Swedish)
Nocturnal Variations
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. III, 8:34408 (R:US)
ASCOT data from the 1980 field-measurement program in the Anderson Creek Valley, California. Vol. I, 8:34406 (R:US)
ASCOT data from the 1980 field measurement program in the Anderson Creek Valley, California. Vol. II, 8:34407 (R:US)
Resource Assessment
Improved diagnostic model for estimating wind energy, 8:33589 (R:US)
WIND ENERGY CONVERSION SYSTEMS
See WIND TURBINES
WIND GENERATORS
See WIND TURBINES
WIND POWER
Availability
Network for the measurement of wind energy at high masts, 8:33588 (R:SE:In Swedish)
WIND POWER PLANTS
Technical problems of WECS interconnection, 8:33600 (RA:DE)
Data Acquisition Systems
Computer recording system for the assessment of the prototypes of wind power plants. Specified requirements, 8:33603 (R:SE:In Swedish)
Economics
Implementing agreement for a programme of research and development on wind energy conversion systems, 8:33593 (R:DE)
Main results of Annex III a, 8:33590 (RA:DE)
Wind turbine parks in electric utility systems, 8:33594 (RA:DE)
Electric Generators
Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system, 8:33602 (R:SE:In Swedish)
Electrical Equipment
Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system, 8:33602 (R:SE:In Swedish)
Evaluation
Frequency and duration method for the evaluation of wind integration, 8:33598 (RA:DE)
Harmonics
Influence of the harmonics in rotor current on the wave shape of the stator voltage in a double-fed winddriven induction generator, 8:33609 (R:SE)
Interconnected Power Systems
Three different methods for the connection of a wind-powered 2.5 MW asychronous generator to the electric power system, 8:33602 (R:SE:In Swedish)
Meetings
Implementing agreement for a programme of research and development on wind energy conversion systems, 8:33593 (R:DE)
Planning
Wind turbine parks in electric utility systems, 8:33594 (RA:DE)
Reliability
Operating considerations in reliability modeling of wind-assisted utility systems, 8:33599 (RA:DE)
Research Programs
Swedish state power board, 8:33595 (RA:DE)
Systems Analysis
Operating considerations in reliability modeling of wind-assisted utility systems, 8:33599 (RA:DE)
WIND TUNNELS
Uses
Generation of higher levels of turbulence in the test section of the High Speed Cascade Wind Tunnel Braunschweig for simulation of turbomachinery conditions, 8:34217 (R:DE:In German)
WIND TURBINES
See also VERTICAL AXIS TURBINES
Aerodynamics
Response of the Mod-OA wind-turbine rotor to turbulent atmospheric wind, 8:33592 (R:US)

Electric Generators
Wind power plant with a low speed electric generator, 8:33601 (R:SE:In Swedish)
Fabrication
UTRC 15-kW wind-system development. Phase II: fabrication and testing, 8:33610 (R:US)
Mathematical Models
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R:US)
Noise
Preliminary estimation of the expected noise levels from the Swedish WECS prototypes Maglarp and Naesudden, 8:33591 (R:SE)
Performance
Horizontal-axis wind-system rotor performance model comparison: a compendium, 8:33612 (R:US)
Performance Testing
UTRC 15-kW wind-system development. Phase II: fabrication and testing, 8:33610 (R:US)
Reviews
Safety of wind energy conversion systems with horizontal axis (HA WECS), 8:33607 (R:SE)
Rotors
Constructional basis of the project NE 5061481 composite rotor of Kalkugnen, 8:33604 (R:SE:In Swedish)
Turbine Blades
Constructional basis of the project NE 5061481 composite rotor of Kalkugnen, 8:33604 (R:SE:In Swedish)
Turbulence
Response of the Mod-OA wind-turbine rotor to turbulent atmospheric wind, 8:33592 (R:US)

WINDOWS
Air Flow
Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting, 8:33499 (J:US)
Design
Windows as cost effective solar collectors, 8:33501 (J:US)
Heat Mirrors
Heat mirror coatings for internal load dominated buildings, 8:33914 (J:US)
Solar Air Heaters
Windows as cost effective solar collectors, 8:33501 (J:US)
Sun Shades
Use of air flow windows and blinds for building thermal control and for solar-assisted heating, cooling and lighting, 8:33499 (J:US)

WISCONSIN
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

W-L SULFUR DIOXIDE RECOVERY PROCESS
Comparative Evaluations
Maintenance and reliability of utility flue-gas desulfurization: projections vs experience, 8:33019 (R:US)

WNP-2 REACTOR
Washington Public Power Supply System Nuclear Project Number 2, previously known as Hanford-2 Reactor.
Reactor Safety
Safety evaluation report related to the operation of WPPSS Nuclear Project No. 2. Docket No. 50-397 , 8:33752 (R:US)

WOLFRAM
See TUNGSTEN

WOMEN
Whole-Body Irradiation
Age- and sex-related changes in bone mass measured by neutron activation, 8:34512 (R:US)

WOOD
Availability
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
Gasification
Semi-automatic wood gasifier coupled with an adjunct oil-fired boiler/burner unit, 8:33321 (R:US)
Grinding
Utilization and processing of forest energy. Part 6. Properties and grinding of fast growing wood, 8:33358 (R:FI:In Finnish)
Harvesting
Harvesting and utilization of wood for energy purposes, 8:33339 (R:SE)
Harvesting wood for energy, 8:33356 (R:US)
Liquefaction
Second-year project analysis of the Arizona State University process to convert cellulosic wastes into light fuel oil. Final report, 8:33266 (R:US)
Preservation
Fungicide treatment for cooling tower redwood, 8:33239 (RA:US)
Pyrolysis
Liquid fuels from the hydropyrolysis of biomass, 8:33268 (J:US)
Temperature Effects
Temperature extremes in vertical collectors, 8:33546 (J:US)
Transport
Energy research in the mechanical forest industry 1980-1982. Energy consumption in product transport, 8:33928 (R:FI:In Finnish)

WOOD ALCOHOL
See METHANOL

WOOD BURNING FURNACES
Boilers
Wood-fired steam production at Clarkson College of Technology. Final report, 8:33935 (R:US)
Operation
Wood-fired steam production at Clarkson College of Technology. Final report, 8:33935 (R:US)
Steam Generators
Wood-fired steam production at Clarkson College of Technology. Final report, 8:33935 (R:US)

WOOD FUELS
Use of this term is limited to policy, feasibility, and socio-economic studies. For wood properties use WOOD.
Availability
Logging residue as fuelwood in forest farmers houses, 8:33344 (R:SE:In Swedish)
Calorific Value
Scaling of fuelwood and fuelchips, 8:33341 (R:SE:In Swedish)
Drying
Drying of peat and wood biomass. Literature review, 8:33357 (R:FI:In Finnish)
Storing of stump wood in a simulated environment, 8:33340 (R:SE:In Swedish)
Harvesting Equipment
Thinning woodland with small tractors for fuelwood and forestry, 8:33352 (R:US)
Moisture
Importance of cover and air under-base with storage of fuel chip chips, 8:33347 (R:SE:In Swedish)
Program Management
Workplan for an analysis of the fuelwood cycle in Kenya and the feasiility of expanded fuelwood production, 8:33350 (R:SE)
Research Programs
Evalution of the research project 'Forest Energy', 8:33876 (R:SE)
Solar Drying
Drying of fuel chips with solar panel warmed air, 8:33346 (R:SE:In Swedish)
Storage
Importance of cover and air under-base with storage of fuel chip chips, 8:33347 (R:SE:In Swedish)
Storing of stump wood in a simulated environment, 8:33340 (R:SE:In Swedish)

WOOD PRODUCTS INDUSTRY
Raw Materials
Wood qualities and measurement of whole tree, 8:33342 (R:SE:In Swedish)
WORKERS
See PERSONNEL
WORMS (ROUND)
See NEMATODES
WUERGASSEN REACTOR
Plutonium Recycle
Plutonium recycling in large light-water reactors and in the nuclear power station Wuergassen, 8:33703 (R:DE:In German)
WWER TYPE REACTORS
Coolant Cleanup Systems
Application of electromagnetic filter in water treatment in pressurized water reactor power plant, 8:33677 (RA:CS:In Czech)
Feedwater Heaters
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Fluid Poison Control
Cost-benefit analysis of application of H_3BO_3 thermal regeneration in WWER type reactors, 8:33678 (RA:CS:In Czech)
Secondary Coolant Circuits
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Steam Generators
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Steam Separators
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Steam Turbines
Water regime of secondary circuit of WWER nuclear power plant, 8:33675 (RA:CS:In Czech)
Water Chemistry
Automatic analyzers for monitoring water composition and their applications in nuclear power engineering, 8:33679 (RA:CS:In Czech)
WYHL-1 REACTOR
Hearings
Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R:DE:In German)
Reactor Licensing
Hearing. Expectations and communication. Two selected examples are given, 8:33694 (R:DE:In German)
WYOMING
Coal Deposits
Chemical analyses of coal and shale from the Wasatch Formation in core hole B-1, City of Buffalo, Johnson County, Wyoming, 8:33016 (R:US)
Low-Level Radioactive Wastes
1979 state-by-state assessment of low-level radioactive wastes shipped to commercial burial grounds, 8:33222 (R:US)
Oil Sand Deposits
Review of reported tar-sand occurrences and recent projects in Wyoming (78 occurrences), 8:33168 (R:US)
Radioactive Waste Management
Low-level waste management: a report on the states - the laws, the legislature, the administration, 8:33197 (R:US)

X

XENOBIOTICS
Testing for effects of chemicals on ecosystems: working papers prepared as background. Final report, 8:34455 (R:US)
XENON
Adsorption
Photoemission studies of Ar, Kr, and Xe adsorbed on Al(III): dipole moments, polarizabilities and spatial distributions, 8:34114 (J:GB)
Charged-Particle Transport
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
XENON 119
Energy Levels
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
XENON 121
Energy Levels
Beta-decay measurements of neutron-deficient cesium isotopes, 8:34823 (R:US)
XENON IONS
Absorption Spectra
Relativistic many-body theory of atomic structures, 8:34720 (R:US)
Hyperfine Structure
Relativistic many-body theory of atomic structures, 8:34720 (R:US)
Ion-Atom Collisions
Recoil ions: production and uses, 8:34713 (RA:US)
Trapping of slow recoil ions: past results and speculations on the future, 8:34714 (RA:US)
Isoelectronic Atoms
Relativistic many-body theory of atomic structures, 8:34720 (R:US)
Stopping Power
Slowing down of fast heavy ions in matter, 8:34716 (RA:US)
X-RAY DETECTION
Counting Circuits
Pulse pile-up effects, 8:34906 (R:US)
X-RAY FLUORESCENCE ANALYSIS
Energy Resolution
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)
Sensitivity
Sensitivity calculations for multielemental trace analysis by synchrotron radiation induced X-ray fluorescence, 8:34061 (J:NL)
X-RAY RADIOGRAPHY
Feasibility Studies
X-ray cineradiography with particular and non-particular contrast-media. A comparative study for theory and praxis, 8:34526 (R:DE:In German)
X-RAY SOURCES
For cosmic sources of x radiation use COSMIC X-RAY SOURCES.
Linear Accelerators
Multidimensional study of a 50-MeV, 1500-rad/pulse radiographic linac, using the stagger-tuning concept, 8:34282 (R:US)
Radiation Doses
Comparison of the SANDYL Monte-Carlo code calculations of 20.9-MeV bremsstrahlung with published experimental data, 8:34861 (R:US)
X-RAY SPECTRA
Energy Resolution
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)
X-RAY SPECTROMETERS
Performance Testing
X-ray fluorescence analysis using crystal-diffraction spectrometer with proton excitation, 8:34538 (RA:SU:In Russian)
XYLOSE
Fermentation
Xylose fermentation with Clostridium thermohydrosulfuricum, 8:33275 (R:US)

Y

YANG-MILLS THEORY
Gauge Invariance
Quantum theory of massive Yang-Mills fields, 2. Gauge covariance, 8:34785 (R:JP)

Mass
Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric, 8:34784 (R:JP)
Quantum theory of massive Yang-Mills fields, 2. Gauge covariance, 8:34785 (R:JP)
Mass Spectra
Montonen-Olive conjecture, 8:34771 (R:XA)
Phase Transformations
Quark-gluon plasma lectures presented at the 1982 Arctic School of Physics, August 1-14, Akaslampalo, Finland, 8:34757 (R:US)
Renormalization
Comment on the Adler-Bardeen theorem in non-Abelian gauge theories, 8:34782 (R:JP)
Quantum theory of massive Yang-Mills fields, 1. Basis of formulation with indefinite metric, 8:34784 (R:JP)

YOLK
See EGGS

YTTERBIUM
Activation Analysis
Precise trace rare earth analysis by radiochemical neutron activation, 8:34065 (J:CH)
Neutron Reactions
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J:US)

YTTERBIUM 170 TARGET
Neutron Reactions
Neutron capture cross sections of natural Yb, ^{170}Yb, ^{175}Lu, and ^{184}W in the energy range from 5 to 200 keV for the ^{176}Lu-chronometer, 8:34833 (J:US)

YTTERBIUM COMPOUNDS
Absorption Spectra
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)
Electrochemistry
Spectroscopy and electrochemistry of selected lanthanides in molten dimethyl sulfone, 8:34090 (R:US)

YTTRIUM
Activation Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
Scanning Electron Microscopy
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)
X-Ray Fluorescence Analysis
Analysis of a Nd:YAG laser crystal by X-ray fluorescence, scanning electron microscopy and neutron activation analysis, 8:34063 (J:CH)

YTTRIUM 89 TARGET
Neutron Reactions
Production cross sections for (n,t) reactions in ^{40}Ca, ^{54}Fe, ^{86}Sr, ^{89}Y, ^{102}Pd, ^{112}Sn, $^{106\ 114}$Cd, ^{130}Te, ^{139}La, ^{204}Pb, and ^{205}Tl with 14.6 MeV neutrons, 8:34816 (J:US)

YTTRIUM ALUMINIUM GARNETS
See ALUMINIUM OXIDES

Z

Z PINCH DEVICES (LINEAR)
See LINEAR Z PINCH DEVICES

ZEA MAYS
See MAIZE

ZINC
Biological Effects
Zinc-induced resistance to alkylating agents: lack of correlation between cell survival and metallothionein content, 8:34641 (J:US)
Flotation
Ion flotation of zinc using ethylhexadecyldimethylammonium bromide, 8:34081 (J:US)
Precipitation
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)
Removal
Heavy metals removal from double alkali waste: makes waste product usable, 8:33055 (RA:US)

ZINC ALLOYS
X-Ray Fluorescence Analysis
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)
X-Ray Spectra
Maximum a posteriori technique applied to energy-dispersive x-ray fluorescence spectra, 8:33994 (J:GB)

ZINC OXIDES
Sorptive Properties
Chemical properties of anion vacancies on zinc oxide, 8:34006 (J:NL)
Vacancies
Chemical properties of anion vacancies on zinc oxide, 8:34006 (J:NL)

ZIRCONIUM 95
Radioecological Concentration
Columbia River radiological monitoring, 8:34458 (RA:US)

ZIRCONIUM ALLOYS
Corrosion
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Creep
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Hydridation
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)
Physical Radiation Effects
High-strength, creep-resistant excel pressure tubes, 8:33987 (J:US)
Texture
Effect of texture on hydride reorientation and delayed hydrogen cracking in cold-worked Zr-2.5Nb, 8:33986 (J:US)

ZIRCONIUM COMPLEXES
Chemical Preparation
Preparation and reaction of metal ketene complexes of Zr and Ti, 8:34096 (J:US)

CONTRACT NUMBER INDEX

Numbers assigned to DOE contracts under which documents announced in this publication were prepared are included in this index.

Contract No.	Abstract No.	Report No.
AC01-76ET13112	United Technologies Corp., South Windsor, CT (USA). Power Systems Div.	
	8:33883	FCR—3278
AC01-78EI06397	CEXEC, Inc., McLean, VA (USA)	
	8:33852	DOE/EI/06397—T1
AC01-78ET29297	Power Technologies, Inc., Schenectady, NY (USA)	
	8:33658	DOE/ET/29297—2
AC01-78PE70009	Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)	
	8:33619	DOE/PE/70009—T1
	8:33620	DOE/PE/70009—T4
	8:33864	DOE/PE/70009—T2
AC01-79ET10023	Raymond Kaiser Engineers, Inc., Oakland, CA (USA)	
	8:33072	DOE/ET/10023—4-Vol.1
	8:33073	DOE/ET/10023—4-Vol.2
	8:33074	DOE/ET/10023—4-Vol.3
	8:33075	DOE/ET/10023—4-Vol.4
AC01-79ET13153	Princeton Univ., NJ (USA). Dept. of Chemical Engineering	
	8:32948	DOE/ET/13153—T9
AC01-79ET21105	Spectron Development Labs., Inc., Costa Mesa, CA (USA)	
	8:33539	DOE/ET/21105—T1
AC01-79ET29364	California Univ., Berkeley (USA). Dept. of Electrical Engineering and Computer Sciences	
	8:33650	CONF-821235—1
	California Univ., Berkeley (USA)	
	8:33653	CONF-830543—2
	8:33655	CONF-830628—2
	8:33656	CONF-830628—3
AC01-79PE70019	Systems Consultants, Inc., Washington, DC (USA)	
	8:33021	DOE/PE/70019—T1
AC01-79PE70041	Hagler, Bailly and Co., Washington, DC (USA)	
	8:33147	DOE/PE/70041—T1
	Resource Planning Associates, Inc., Washington, DC (USA)	
	8:33865	DOE/PE/70041—T2
AC01-80PE70225	Bentz (E.J.) and Associates, Inc., Springfield, VA (USA)	
	8:33621	DOE/PE/70225—1
AC01-80RG10295	Barry (Theodore) and Associates, Los Angeles, CA (USA)	
	8:33867	DOE/RG/10295—T1
AC01-81EI10775	JWK International Corp., Annandale, VA (USA)	
	8:33856	DOE/EIA—0394-Vol.1
	8:33857	DOE/EIA—0394-Vol.2
	8:33858	DOE/EIA—0394-Vol.3
AC01-81EV10502	Little (Arthur D.), Inc., Cambridge, MA (USA)	
	8:33165	DOE/EV/10502—1
AC01-81PE70274	ICF, Inc., Washington, DC (USA)	
	8:33622	DOE/PE/70274—T1
	8:33623	DOE/PE/70274—T2
	8:33624	DOE/PE/70274—T3
AC01-82CE76221	California Univ., Berkeley (USA)	
	8:33652	CONF-830543—1
AC02-76CH00016	Australian National Univ., Canberra. Inst. of Advanced Studies	
	8:33654	CONF-830628—1
	California Univ., Berkeley (USA)	
	8:33657	CONF-830628—4
	Brookhaven National Lab., Upton, NY (USA)	
	8:32946	DOE/CH/00016—1402
	8:33668	BNL-NUREG—32798
	8:33764	NUREG/CR—3013
	8:33890	BNL—32828
	Thermacore, Inc., Lecia, PA (USA)	
	8:33891	BNL—51622
	Brookhaven National Lab., Upton, NY (USA)	
	8:33955	BNL-NUREG—32824
	8:34013	BNL—32651
	8:34052	BNL—32898
	8:34077	Journal of Chromatography 206 205-214 (1981).
	8:34098	Journal of Colloid and Interface Science 87 NO. 1. 209-215 (May 1982).
	8:34130	Journal of Organometallic Chemistry (Amsterdam) 218 105-114 (1981).
	8:34177	BNL—32680
	8:34230	BNL-NUREG—32897
	8:34239	AIChE (American Institute of Chemical Engineers) Journal 26 NO. 3. 390-398 (May 1980).
	8:34263	BNL—32658
	8:34281	BNL—32730
	8:34299	BNL—32770
	8:34300	BNL—32843
	8:34301	BNL—32849
	8:34302	BNL—32904
	8:34303	BNL—32929
	8:34322	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science 2
	8:34352	BNL—32788
	8:34353	BNL—32847
	8:34508	Advances in Enzyme Regulation 20 3-22 (1982).
	8:34511	BNL—32891
	8:34512	BNL—32905
	8:34697	BNL—32910
	8:34746	BNL—32855
	8:34747	BNL—32901
	8:34748	BNL—32920
	8:34789	BNL-NCS—51647
	8:34790	BNL-NCS—51655
	8:34809	Transactions of the New York Academy of Sciences 40 1-19 (15 Sep 1980).
	8:34831	BNL—32902
AC02-76CH03000	Ecole Normale Superieure, 75 - Paris (France). Lab. de Physique Theorique	
	8:34758	FERMILAB-Pub—83/25-THY
AC02-76CH03073	Princeton Univ., NJ (USA). Plasma Physics Lab.	
	8:34903	PPPL—1990
	8:34904	PPPL—1995
	8:34905	PPPL—1996
	8:34906	PPPL—1999
	8:34907	PPPL—2007
	8:34934	PPPL—1994

Contract No.	Abstract No.	Report No.
	8:34935	PPPL—1997
	8:34936	PPPL—2000
	8:34937	PPPL—2004
AC02-76ER00881	**Wisconsin Univ., Madison (USA). Dept. of Physics**	
	8:34767	CONF-820971—4
AC02-76ER01198	**Univ. of Illinois, Urbana-Champaign**	
	8:34047	Philosophical Magazine 46 NO. 6. 995-1007 (1982).
AC02-76ER01763	**Ohio State Univ., Columbus**	
	8:34200	Journal of Chemical Education 58 NO. 2. 84-87 (Feb 1981).
AC02-76ER02026	**Minnesota Univ., Minneapolis**	
	8:34182	Journal of Photochemistry 19 295-302 (1982).
AC02-76ER02190	**Univ. of Utah, Salt Lake City**	
	8:34208	Advances in Chemistry Series NO. 197. 123-145 (1981).
AC02-76ER02944	**Wright State Univ., Dayton, OH (USA). Dept. of Chemistry**	
	8:34087	AD-P—000282/4
AC02-76ER03077	**Rutger-the State Univ., New Brunswick, NJ**	
	8:34018	Macromolecules 15 549-553 (1982).
AC02-76ER03416	**Pennsylvania State Univ., University Park**	
	8:34190	Journal of Photochemistry 16 105-120 (1981).
AC02-76ET52040	**Illinois Univ., Urbana (USA). Fusion Studies Lab.**	
	8:34925	DOE/ET/52040—T8
AC02-76EV01599	**Michigan State Univ., Hickory Corners**	
	8:33360	Oecologia 50 158-161 (1981).
	8:34442	Archiv fuer Hydrobiologie 93 NO. 3. 265-271 (Feb 1982).
	8:34443	Limnology and Oceanography 27 NO. 3. 564-569 (1982).
	8:34446	Archiv fuer Hydrobiologie 92 NO. 3. 265-286 (Oct 1981).
	8:34447	Verhandlungen - Internationale Vereinigung fuer Theoretische und Angewandte Limnologie 21
	8:34457	Journal of Freshwater Ecology 1 NO. 4. 365-371 (Apr 1982).
	8:34491	Plant Physiology 69 54-57 (1982).
	8:34507	Journal of Freshwater Ecology 1 NO. 4. 365-371 (Apr 1982).
	8:34510	Plant Science Letters 21 199-207 (1981).
	8:34562	Journal of Phycology 17 129-134 (1981).
	8:34563	Limnology and Oceanography 26 NO. 5. 976-980 (1981).
AC02-76EV03286	**Johns Hopkins Univ., Baltimore, MD (USA). Dept. of Environmental Health Sciences**	
	8:34574	DOE/EV/03286—22
AC02-76EV03490	**Univ. of Rochester School of Medicine and Dentistry, NY**	
	8:34489	Biochimica et Biophysica Acta 703 34-41 (1982).
	8:34569	
AC02-77CH00178	**Solar Energy Research Inst., Golden, CO (USA)**	
	8:33354	SERI/TP—234-1816
	8:33410	SERI/TP—254-1935
	8:33413	
AC02-77CS34142	**Pennsylvania Univ., Philadelphia (USA). Dept. of Mechanical Engineering and Applied Mechanics**	
	8:33404	COO—4142-11
AC02-77ER04254	**Northwestern Univ., Evanston, IL**	
	8:34094	Journal of Catalysis 78 NO. 2. 289-305 (Dec 1982).
AC02-77ER04448	**State Univ. of New York, Buffalo**	
	8:34728	Optics Communications 39 NO. 3. 159-162 (1 Oct 1981).

Contract No.	Abstract No.	Report No.
AC02-77ER04471	**Massachusetts Univ., Amherst**	
	8:34080	Analytical Chemistry 1 NO. 2. 51-55 (1981).
AC02-78ET20565	**Reynolds Metals Co., Sheffield, AL**	
	8:33374	CONF-810622—Vol.2(Jun 1981).
AC02-78EV04776	**Univ. of Colorado, Boulder**	
	8:34120	Chemical Physics Letters 80 NO. 3. 469-474 (15 Jun 1981).
	8:34121	Journal of Vacuum Science and Technology 18 NO. 2. 586-588 (Mar 1981).
	8:34127	Surface Science 106 179-187 (1981).
AC02-79CS30238	**Georgia Inst. of Tech., Atlanta**	
	8:33534	Proceedings of the Annual Meeting - American Section of the International Solar Energy Soc
AC02-79ET21067	**Univ. of New Hampshire, Durham**	
	8:32999	Energy Progress 2 NO. 2. 91-95 (Jun 1982).
AC02-79ET29147	**Puerto Rico Electric Power Authority, San Juan. Electrical Planning and Research Div.**	
	8:33402	DOE/ET/29147—6
AC02-80ER10554	**Ohio State Univ., Columbus**	
	8:34086	HRC and CC, Journal of High Resolution Chromatography and Chromatography Communications 3
AC02-81ER10811	**Brown Univ., Providence, RI**	
	8:34103	Berichte der Bunsengesellschaft fuer Physikalische Chemie 86 187-191 (1982).
AC02-81ER10875	**Utah State Univ., Logan**	
	8:34097	Sciences (New York) 216 1324-1325 (18 Jun 1982).
AC02-82CH10104	**New England Fuel Inst., Watertown, MA (USA)**	
	8:33321	DOE/CH/10104—1
AC02-82ER40051	**Wisconsin Univ., Madison (USA). Dept. of Physics**	
	8:34766	CONF-820371—9
AC02-82NE34096	**Pennsylvania State Univ., University Park (USA)**	
	8:33742	DOE/NE/34096—1
AC03-76ET53057	**Science Applications, Inc., Boulder, CO (USA)**	
	8:34938	SAI—254-83-438-LJ
AC03-76SF00098	**Lawrence Berkeley Lab., CA (USA)**	
	8:33175	LBL—15816
	8:33260	Journal of Catalysis 78 NO. 2. 341-351 (Dec 1982).
	8:33275	LBL—15817
	8:33557	LBL—15671
	California Univ., Berkeley (USA)	
	8:33750	LBL—14846-Rev.
	Lawrence Berkeley Lab., CA (USA)	
	8:33893	LBL—14026
	8:33894	LBL—14790
	8:33895	LBL—15907
	8:33963	LBL—15607
	8:33964	LBL—15956
	8:34091	LBL—15842
	8:34178	LBL—15463
	8:34212	LBL—15799
	8:34270	LBL—15119
	8:34271	LBL—15142
	8:34283	LBL—15117
	8:34284	LBL—15132
	Los Alamos National Lab., NM (USA)	
	8:34285	LBL—15137
	Lawrence Berkeley Lab., CA (USA)	
	8:34286	LBL—15140
	8:34287	LBL—15141
	8:34288	LBL—15146
	8:34289	LBL—15158

Contract No.	Abstract No.	Report No.
	8:34290	LBL—15208
	8:34291	LBL—15234
	8:34292	LBL—15963
	8:34314	LBL—15088
	8:34315	LBL—15108
	8:34316	LBL—15136
	8:34317	LBL—15147
	8:34318	LBL—15148
	8:34319	LBL—15157
	8:34320	LBL—15848
	8:34379	LBL—15866
	8:34557	
	8:34738	LBL—15468
	8:34739	LBL—15646
	8:34750	LBL—91-Rev(2)
	8:34795	LBL—10593
	8:34808	LBL—15874
	8:34823	LBL—15875
	8:34881	LBL—15254
	8:34962	LBL—15651
AC03-76SF00515	Stanford Linear Accelerator Center, CA (USA)	
	8:34321	SLAC-PUB—3073
	8:34753	SLAC—255
	8:34788	SLAC-PUB—2857
	8:34972	Journal of the American Statistical Association 76 NO. 376. 817-823 (Dec 1981).
AC03-76SF00700	Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center	
	8:33688	CONF-830518—3
AC03-77ET20444	Southwestern Engineering Co., Los Angeles, CA	
	8:33381	CONF-810622—Vol.2(Jun 1981).
AC04-76DP00053	Monsanto Research Corp., Miamisburg, OH	
	8:32998	Fossil Energy I and C Briefs 3 NO. 5. 3-7 (Sep 1982).
	8:33180	Separation Science and Technology 16 NO. 10. 1321-1337 (1981).
AC04-76DP00613	Bendix Corp., Kansas City, MO (USA)	
	8:34241	BDX—613-2872
	Black and Veatch Consulting Engineers, Kansas City, MO (USA)	
	8:34253	BDX—613-2938
AC04-76DP00656	General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.	
	8:33262	GEPP-TIS—702
AC04-76DP00789	Sandia National Labs., Albuquerque, NM (USA)	
	8:32961	SAND—82-2355
	8:32995	SAND—83-0057
	8:33221	NUREG/CR—3235-Vol.1
	8:33245	SAND—83-0660
	8:33248	NUREG/CR—3235-Vols.5-6
	8:33252	NUREG/CR—3235(Vols.2-3-4)
	8:33256	SAND—83-0004C
	Sandia National Labs., Livermore, CA (USA)	
	8:33365	SAND—83-8213
	Sandia National Labs., Albuquerque, NM (USA)	
	8:33613	SAND—82-2543C
	8:33614	SAND—82-2552C
	8:33757	NUREG/CR—2650-R4
	Harvard Univ., Boston, MA (USA). Dept. of Environmental Health Sciences	
	8:33766	NUREG/CR—3185
	Sandia National Labs., Albuquerque, NM (USA)	
	8:33767	NUREG/CR—3226
	8:33968	SAND—82-2498C
	Sandia National Labs., Livermore, CA (USA)	
	8:33969	SAND—83-8214
	Sandia National Labs., Albuquerque, NM (USA)	
	8:34017	SAND—82-2364
	8:34044	SAND—82-2470C
	8:34145	Archive for Rational Mechanics and Analysis 75 NO. 3. 257-284 (1980).
	8:34222	SAND—82-2172
	8:34223	SAND—83-0002C
	8:34224	SAND—83-0003C
	8:34225	SAND—83-0352C
	8:34226	SAND—83-0738
	8:34229	SAND—83-0283
	Wisconsin Univ., Madison (USA)	
	8:34247	SAND—82-7156
	Sandia National Labs., Albuquerque, NM (USA)	
	8:34248	SAND—83-0378C
	8:34384	SAND—82-2795C
	8:34669	SAND—82-2441
	8:34673	SAND—83-0917C
	8:34939	SAND—83-0663C
	8:34966	SAND—83-0099C
AC04-76DP03533	Rockwell International, Golden, CO	
	8:33182	Journal of Catalysis 78 NO. 2. 477-481 (Dec 1982).
	United Technologies Research Center, East Hartford, CT (USA)	
	8:33610	RFP—3358
	Rockwell International Corp., Golden, CO (USA). Wind Energy Research Center	
	8:33611	RFP—3488
	Aerospace Systems, Inc., Burlington, MA (USA)	
	8:33612	RFP—3508
	Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant	
	8:33944	RFP-Trans—399(Apr 1983).
	8:34387	RFP—3499
AC05-76OR00033	Oak Ridge Associated Universities, Inc., TN (USA)	
	8:34952	DOE/ER—0127/1
AC05-81OR20837	Science Applications, Inc., McLean, VA (USA)	
	8:33618	DOE/OR/20837—T1
	Science Applications, Inc., Oak Ridge, TN (USA)	
	8:33826	DOE/OR/20837—1
AC06-76RL01830	Pacific Northwest Lab., Richland, WA (USA)	
	8:33188	PNL—4465
	INTERA Environmental Consultants, Inc., Houston, TX (USA)	
	8:33223	ONWI—419
	8:33224	ONWI—436
	Pacific Northwest Lab., Richland, WA (USA)	
	8:33232	PNL-SA—10934
	8:33236	Radioactive Waste Management (Oak Ridge, Tennessee) 3 NO. 1. 75-113 (Sep 1982).
	8:33240	NUREG/CR—2924
	INTERA Environmental Consultants, Inc., Houston, TX (USA)	
	8:33241	ONWI—432
	8:33242	ONWI—433
	8:33251	ONWI—446
	SRI International, Menlo Park, CA (USA)	
	8:33589	PNL—4526
	Battelle Human Affairs Research Center, Seattle, WA (USA)	
	8:33730	NUREG/CR—3217
	Pacific Northwest Lab., Richland, WA (USA)	
	8:33758	NUREG/CR—2716-Vol.4
	8:33761	NUREG/CR—3012-Vol.1
	8:33762	NUREG/CR—3012-Vol.2
	8:33763	NUREG/CR—3012-Vol.3
	8:33902	PNL—4717
	8:33967	PNL-SA—11289
	8:34064	Analytical Chemistry 54 NO. 11. 1883-1885 (1982).

Contract No.	Abstract No.	Report No.
	8:34065	Journal of Radioanalytical Chemistry 69 NO. 1-2. 181-196 (1982).
	8:34415	NUREG/CR—3016
	8:34435	PNL—4657
	INTERA Environmental Consultants, Inc., Houston, TX (USA)	
	8:34601	ONWI—431
	RE/SPEC, Inc., Rapid City, SD (USA)	
	8:34670	ONWI—314
	Pennsylvania State Univ., University Park (USA). Materials Research Lab.	
	8:34671	ONWI—415
	INTERA Environmental Consultants, Inc., Houston, TX (USA)	
	8:34672	ONWI—421
	8:34676	ONWI—435
AC06-77RL01030	**Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations**	
	8:33233	RHO-BW-ST—36P
	8:33244	RHO-HS-SA—19-P
AC06-81ER40048	**Washington Univ., Seattle (USA). Dept. of Physics**	
	8:34680	DOE/ER/40048—23P2
	8:34756	DOE/ER/40048—25-P2
	8:34757	DOE/ER/40048—26-P2
	Washington Univ., Seattle (USA). Nuclear Physics Lab.	
	8:34799	DOE/ER/40048—32-L2
	8:34822	DOE/ER/40048—33-L2
	8:34834	DOE/ER/40048—38-L2
AC07-76ET15350	**Biphase Energy Systems, Santa Monica, CA (USA)**	
	8:33934	DOE/ET/15350—2
AC07-76ID01570	**Inter/Face Associates, Inc., Middletown, CT (USA)**	
	8:33197	DOE/ID/01570—T59
	NUS Corp., San Francisco, CA (USA)	
	8:33222	NUS—3440-Rev.1
	Science Applications, Inc., Idaho Falls, ID (USA)	
	8:33744	GEND-INF—019-Vol.2
AC08-81DP40146	**Westinghouse Electric Corp., Madison, PA (USA). Advanced Energy Systems Div.**	
	8:34913	CONF-830406—40
	Westinghouse Electric Corp., Madison, PA (USA)	
	8:34914	CONF-830406—41
AC08-83NV10282	**EG and G, Inc., Las Vegas, NV (USA). Energy Measurements Group**	
	8:33186	DOE/NV/10282—1013
	EG and G, Inc., Goleta, CA (USA)	
	8:34386	DOE/NV/10282—T2
AC09-76SR00001	**Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.**	
	8:33183	DP-MS—83-4
	8:33187	DP-MS—82-60
	8:33202	DP-MS—82-46
	8:33203	DP-MS—82-61
	8:33204	DP-MS—82-65
	8:33205	DP-MS—82-73
	8:33206	DP-MS—82-81
	8:33207	DP-MS—82-94
	8:33208	DP-MS—82-96
	8:33209	DP-MS—83-18
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant	
	8:33210	DPSP—79-17-12
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.	
	8:33211	DPSP—79-17-17
	8:33212	DPST—70-512
	8:33213	DPST—81-914
	8:33214	DPSTD—82-65-Rev.1
	8:33736	DP-MS—82-109
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant	
	8:33737	DPSP—82-30-14

Contract No.	Abstract No.	Report No.
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.	
	8:33959	DP-MS—82-53
	8:34015	DP-MS—82-54
	8:34043	DPST—78-150-2
	8:34397	DP-MS—82-93
	8:34413	DP-MS—82-79
	8:34414	DP-MS—82-86
	8:34440	DP-MS—82-52
	8:34561	Current Microbiology 6 89-94 (1981).
	8:34852	DP-MS—83-2
	8:34957	DP-MS—82-101
AC13-76GJ01664	**Bendix Field Engineering Corp., Grand Junction, CO (USA)**	
	8:33176	GJBX—12(83)
AC19-78ET12385	**UOP, Inc., Des Plaines, IL (USA)**	
	8:33138	DOE/ET/12385—1
AC20-77ET13108	**Gulf Research and Development Co., Pittsburgh, PA**	
	8:32972	SAND—82-2355(Nov 1982).
AC21-76ET12138	**West Virginia Univ., Morgantown (USA). Dept. of Geology and Geography**	
	8:33166	DOE/ET/12138—1341-Vol.1
	8:33167	DOE/ET/12138—1341-Vol.2
AC21-76MC08060	**TRW Energy Systems Planning Div., McLean, VA (USA)**	
	8:33158	DOE/MC/08060—T1
AC21-81MC16000	**Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.**	
	8:33086	DOE/MC/16000—1294-Vol.4
AC21-82MC19403	**Institute of Gas Technology, Chicago, IL (USA)**	
	8:32952	DOE/MC/19403—1
AC22-76ET10532	**Chevron Research Co., Richmond, CA (USA)**	
	8:32947	DOE/ET/10532—T11
AC22-78ET00260	**Washington State Univ., Pullman (USA). Dept. of Chemical Engineering**	
	8:33265	DOE/ET/00260—T1
AC22-82PC50001	**Gulf Research and Development Co., Pittsburgh, PA (USA)**	
	8:32945	CONF-830549—1
AI01-76ET10136	**Geological Survey, Washington, DC (USA)**	
	8:33102	DOE/ET/10136—T2
AI01-77CS51040	**National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center**	
	8:33948	DOE/NASA/51040—46
AI01-77CS51044	**General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center**	
	8:33951	DOE/NASA/0059—1
AI01-77ET20396	**National Oceanic and Atmospheric Administration, Rockville, MD (USA). Office of Ocean Engineering**	
	8:33403	DOE/NOAA/OTEC—24(Vol.1)
AI01-78CS54277	**Georgia Univ., Athens (USA)**	
	8:33933	DOE/CS/54277—T1
AI08-82DP40172	**Jet Propulsion Lab., Pasadena, CA (USA)**	
	8:34911	CONF-811174—6
AM03-76SF00034	**Univ. of California, Davis**	
	8:34186	Advances in Chemistry Series NO. 197. 157-178 (1981).
	8:34209	Advances in Chemistry Series NO. 197. 80-122 (1981).
AP01-82PE70472	**National Conference of State Legislatures, Denver, CO (USA)**	
	8:33866	DOE/PE/70472—T1
AS01-78CS35235	**Texas Univ., Austin (USA). Center for Energy Studies**	
	8:33412	TENRAC/EDF—050
AS05-76ER04535	**Texas Southern Univ., Houston**	
	8:34081	Microchemical Journal 26 80-85 (1981).

Contract No.	Abstract No.	Report No.
AS05-78ER05781	**Univ. of Aberdeen, Scotland**	
	8:34144	Journal of Non-Crystalline Solids 38 & 39 371-376 (1980).
AS05-81ER40008	**Florida Univ., Gainesville (USA). Dept. of Physics**	
	8:34765	DOE/ER/40008—33
AS19-80BC10302	**Oklahoma State Univ., Stillwater**	
	8:33109	CONF-8205140—(Feb 1983).
AS19-80BC10304	**Oklahoma State Univ., Stillwater**	
	8:33120	CONF-8205140—(Feb 1983).
AS19-81BC10508	**Univ. of Southern California, Los Angeles**	
	8:33110	CONF-8205140—(Feb 1983).
AS20-80LC10442	**Univ. of Colorado, Boulder**	
	8:32980	SAND—82-2355(Nov 1982).
AS20-82LC10916	**Wyoming Geological Survey, Laramie (USA)**	
	8:33168	DOE/LC/10916—T1
AT03-76ER70224	**California Univ., Los Angeles (USA). Inst. of Geophysics and Planetary Physics**	
	8:33569	DOE/ER/70224—T6
AT03-76ET51011	**GA Technologies, Inc., San Diego, CA (USA)**	
	8:34926	GA-A—16890
AT03-76SF70046	**GA Technologies, Inc., San Diego, CA (USA)**	
	8:33682	GA-A—16918
AT03-81SF11563	**California Univ., San Diego, La Jolla (USA). Dept. of Chemistry**	
	8:33577	DOE/SF/11563—T1
AT06-79ER10416	**Pavia Univ. (Italy). Ist. di Fisica**	
	8:34863	DOE/ER/10416—T2
AT06-81ER10912	**Univ. of Washington, Seattle**	
	8:34156	Macromolecules 14 NO. 5. 1445-1448 (Sep-Oct 1981).
AT06-82RL10378	**Oregon State Univ., Corvallis (USA). Dept. of Mechanical Engineering**	
	8:33592	DOE/RL/10378--82/1
AT21-81MC14731	**West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering**	
	8:32950	DOE/MC/14731—T1
	8:32951	DOE/MC/14731—T2
AT21-81MC16505	**West Virginia Univ., Morgantown (USA). Dept. of Industrial Engineering**	
	8:34956	DOE/MC/16505—T1
EX-76-A-01-2295	**Massachusetts Inst. of Tech., Cambridge**	
	8:33993	Metallurgical Transactions, [Section] B: Process Metallurgy 12B 17-31 (Mar 1981).
FC01-82PE70431	**National Governors' Association, Washington, DC (USA)**	
	8:33844	DOE/PE/70431—T1
FC01-83FE60181	**North Dakota Univ., Grand Forks (USA). Energy Research Center**	
	8:32941	DOE/FE/60181—4
	8:33015	DOE/FE/60181—2
	North Dakota Univ., Grand Forks (USA). Dept. of Chemical Engineering	
	8:33079	DOE/FE/60181—3
FC07-81ID12259	**Energy Services, Inc., Idaho Falls, ID (USA)**	
	8:33556	DOE/ID/12259—T1
FC22-81FE15079	**Cottrell Environmental Science, Somerville, NJ (USA)**	
	8:33020	DOE/FE/15079—T2
FG01-80CS24448	**Alliance to Save Energy, Washington, DC (USA)**	
	8:33925	DOE/CS/24448—T2
FG01-82EI11550	**Michigan Dept. of Commerce, Lansing (USA)**	
	8:33853	DOE/EI/11550—T1
FG01-82EI19620	**Rhode Island State Fuel Allocation Office, Providence (USA)**	
	8:33854	DOE/EI/19620—T1
FG04-77CS34088	**California Univ., Los Angeles (USA). School of Engineering and Applied Science**	
	8:33540	UCLA-ENG—8078
FG05-79ER10368		
	8:34794	
FG05-80ET53088	**Texas Univ., Austin (USA). Inst. for Fusion Studies**	
	8:34894	DOE/ET/53088—90
FG07-81ID12223	**Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort (USA)**	
	8:33198	DOE/ID/12223—T2
	8:33199	DOE/ID/12223—T3
FG22-80PC30221	**Texas A and M Univ., College Station**	
	8:32966	SAND—82-2355(Nov 1982).
FG22-82PC50804	**Purdue Univ., Lafayette, IN (USA)**	
	8:33267	DOE/PC/50804—2
FG22-82PC51252	**University of Southern California, Los Angeles (USA). Dept. of Chemical Engineering**	
	8:32957	DOE/PC/51252—T2
FG44-81R410371	**Alabama Univ., University (USA). School of Mines and Energy Development**	
	8:33159	DOE/R4/10371—T1
FM01-82FE55014	**Great Plains Gasification Associates, Detroit, MI (USA)**	
	8:32949	DOE/FE/55014—T2
W-31-109-ENG-38	**Argonne National Lab., IL (USA)**	
	8:32942	ANL/FE—83-8
	8:33019	CONF-830617—5
	8:33071	ANL/EES-TM—217
	8:33164	CONF-830550—1
	8:33189	ANL—82-58
	8:33190	ANL—82-78
	8:33191	ANL—83-21
	Energetics, Inc., Columbia, MD (USA)	
	8:33266	DOE/NBM—3011701
	Marine Technology Society, Washington, DC (USA)	
	8:33366	CONF-810622—Vol.2
	Argonne National Lab., IL (USA)	
	8:33538	CONF-830622—4
	8:33548	ANL—82-89
	8:33701	ANL—83-2
	8:33724	CONF-830607—3
	8:33738	CONF-830439—5
	8:33740	CONF-830607—4
	8:33741	CONF-830607—5
	8:33800	ANL/EES-TM—212-Vol.3
	8:33882	CONF-830446—4
	8:33923	ANL/ES—130
	8:33924	CONF-830131—2
	Engineering-Science, Inc., Arcadia, CA (USA)	
	8:33938	ANL/CNSV-TM—112
	Lockman and Associates, Monterey Park, CA (USA)	
	8:33939	ANL/CNSV-TM—113
	Geotechnics, Inc., Columbus, OH (USA)	
	8:33940	ANL/CNSV-TM—114
	8:33988	ACS Symposium Series NO. 179. 219-227 (1982).
	Argonne National Lab., IL (USA)	
	8:34042	CONF-821185—1
	8:34078	Journal of Lipid Research 22 166-171 (1981).
	8:34109	Molecular Crystals and Liquid Crystals 79 319-326 (1982).
	8:34113	Philosophical Magazine, [Part] A: Defects and Mechanical Properties 45 NO. 4. 685-692 (198
	8:34147	Archives of Biochemistry and Biophysics 216 NO. 1. 152-157 (Jun 1982).
	8:34175	Electrophoresis (Weinheim, Federal Republic of Germany) NO. 2. 155-160 (1981).
	8:34262	ANL—82-59
	8:34264	CONF-830311—128
	8:34306	CONF-830311—130
	8:34307	CONF-830311—131
	8:34308	CONF-830311—132

Contract No.	Abstract No.	Report No.
	8:34412	CONF-830460—2
	8:34585	IAEA-SM—266/24
	8:34707	CONF-830130—
	8:34720	CONF-830449—2
	8:34745	ANL-HEP-CP—82-67
	8:34806	CONF-830469—2
	8:34819	CONF-830469—1
	8:34835	CONF-830469—3
	8:34909	ANL/FPP/TM—171
	8:34910	ANL/FPP/TM—173
	8:34915	CONF-830406—42
	8:34916	CONF-830406—44
	8:34917	CONF-830406—45
	8:34918	CONF-830406—46
	8:34919	CONF-830406—47
	8:34920	CONF-830406—48
	8:34921	CONF-830406—49
	8:34922	CONF-830406—50
	8:34923	CONF-830406—51
	Colorado Univ., Boulder (USA). Dept. of Computer Science	
	8:34955	ANL/MCS-TM—6
W-7405-ENG-26	**Oak Ridge National Lab., TN (USA)**	
	8:32960	ORNL/TM—8576
	Massachusetts Inst. of Tech., Oak Ridge, TN (USA). School of Chemical Engineering Practice	
	8:33058	ORNL/MIT—361
	8:33067	ORNL/MIT—357
	8:33136	Developments in Industrial Microbiology 22 589-597 (1981).
	8:33185	Proceedings of the Society of Photo-Optical Instrumentation Engineers 296 251-253 (1981).
	Oak Ridge National Lab., TN (USA)	
	8:33196	CONF-830451—4
	8:33228	ORNL/TM—8539
	8:33359	Conference Record of the IEEE (Institute of Electrical and Electronics Engineers) Photovol
	8:33565	ORNL—5940
	8:33635	CONF-820331—(1982).
	8:33651	CONF-830464—1
	8:33659	DOE/NBB—0033
	8:33662	CONF-830446—3
	United Engineers and Constructors, Inc., Philadelphia, PA (USA)	
	8:33709	ORNL/TM—8790
	Oak Ridge National Lab., TN (USA)	
	8:33734	ORNL/TM—8716
	8:33735	CONF-830418—3
	8:33739	CONF-830462—1
	8:33755	NUREG/CR—2000-Vol.2-No.4
	8:33760	NUREG/CR—2874-Vol.3
	8:33765	NUREG/CR—3155
	8:33783	ORNL/TM—8714
	8:33900	ORNL/CON—114
	8:33901	ORNL/CON—122
	8:33953	ORNL—5943
	Bristol Univ. (UK). H.H. Wills Physics Lab.	
	8:33956	CONF-820434—20
	Oak Ridge National Lab., TN (USA)	
	8:33957	CONF-830418—4
	8:33958	CONF-830419—6
	Oak Ridge Y-12 Plant, TN (USA)	
	8:33974	Y/DV—282
	8:33990	Vacuum 32 NO. 2. 107-112 (1982).
	Oak Ridge National Lab., TN (USA)	
	8:34009	CONF-830437—2
	8:34020	CONF-820331—
	8:34059	ORNL—5949
	8:34069	Chromatographia 14 NO. 7. 421-424 (Jul 1981).
	8:34072	Microscope 29 NO. 1. vp (1981).
	8:34073	Philosophical Magazine, [Part] A: Defects and Mechanical Properties 44 NO. 4. 931-942 (198

Contract No.	Abstract No.	Report No.
	8:34074	International Journal of Mass Spectrometry and Ion Physics 40 211-215 (1981).
	Tennessee Univ., Knoxville (USA). Dept. of Chemistry	
	8:34090	CONF-830419—5
	8:34100	Geochimica et Cosmochimica Acta, Supplement 46 NO. 3. 367-370 (Mar 1982).
	8:34102	SIAM (Society for Industrial and Applied Matheatics) Journal of Mathematical Analysis 13 N
	8:34108	Inorganica Chimica Acta 57 161-164 (1982).
	8:34111	Journal of Physical Chemistry NO. 86. 4598-4605 (1982).
	8:34122	Chemical Physics Letters 78 NO. 1. 78-80 (15 Feb 1981).
	8:34129	CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 5 NO. 2. 103-104 (1981).
	8:34134	Journal of the Chemical Society, Faraday Transactions 2 2 NO. 77. 1399-1409 (1981).
	8:34139	Journal of Chemical Thermodynamics 13 101-113 (1981).
	8:34142	Journal of Chemical Thermodynamics 13 131-137 (1981).
	8:34150	Journal of Molecular Spectroscopy 92 127-140 (1982).
	8:34169	ACS Symposium Series NO. 162. 11-34 (1981).
	8:34174	Modern Aspects of Electrochemistry NO. 14. 319-424 (1982).
	8:34184	Chemical Physics Letters 80 NO. 3. 504-511 (15 Jun 1981).
	Oak Ridge National Lab., TN (USA)	
	8:34205	CONF-830419—7
	8:34256	ORNL/TM—8618
	8:34324	
	8:34396	CONF-830459—1
	8:34400	ORNL—5999
	8:34402	ORNL/TM—8749
	8:34424	CONF-830460—1
	8:34449	CONF-820418—
	8:34486	Biochemical and Biophysical Research Communications 107 NO. 2. 642-648 (30 Jul 1982).
	8:34556	Analytical and Quantitative Cytology 25 NO. 2. 115-122 (Jun 1982).
	8:34566	Journal of Oral Pathology 11 228-236 (1982).
	National Inst. of Environmental Health Sciences, Research Triangle Park, NC (USA)	
	8:34572	CONF-820439—7
	Oak Ridge National Lab., TN (USA)	
	8:34573	CONF-820594—2
	8:34605	Mechanisms of Ageing and Development 19 141-146 (1982).
	8:34611	American Midland Naturalist 108 NO. 1. 187-193 (1982).
	8:34615	CONF-820448—5
	8:34616	CONF-8104202—1
	8:34636	Cancer Research 42 3050-3055 (Aug 1982).
	8:34637	American Journal of Pathology 108 NO. 2. 231-239 (Aug 1982).
	8:34638	Cancer (Philadelphia) 50 NO. 1. 107-113 (1 Jul 1982).
	8:34639	Mutation Research 95 377-388 (1982).

Contract No.	Abstract No.	Report No.
	8:34640	Mutation Research 98 319-374 (1982).
	8:34642	UCLA Symposia on Molecular and Cellular Biology, New Series 331-349 (1982).
	8:34729	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science N
	8:34846	CONF-830465—1
	8:34892	SIAM Journal on Scientific and Statistical Computing 2 NO. 2. 141-152 (Jun 1981).
	8:34900	ORNL/TM—8403
	8:34901	ORNL/TM—8467
	8:34902	ORNL/TM—8648
	McDonnell Douglas Astronautics Co., St. Louis, MO (USA)	
	8:34912	CONF-830406—38
	Oak Ridge National Lab., TN (USA)	
	8:34924	CONF-830406—Absts.
	8:34933	ORNL/CSD/TM—198
	8:34964	ORNL—5723
W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	8:33246	LA—7971-MS
	8:33406	LA-UR—83-990
	8:33407	LA-UR—83-1114
	8:33689	LA-UR—83-1248
	8:33692	LA-UR—83-1168
	8:33726	LA-UR—83-148
	8:33748	LA-UR—83-658
	8:33749	LA-UR—83-1238
	8:33759	NUREG/CR—2814-Vol.3
	8:33962	LA-UR—83-1107
	8:34054	LA-UR—83-1060
	8:34055	LA-UR—83-1115
	8:34068	American Industrial Hygiene Association Journal 42 699-706 (Oct 1981).
	8:34213	LA-UR—83-147
	8:34220	LA-UR—83-1251
	8:34231	LA-UR—83-1080
	8:34282	LA-UR—83-775
	8:34494	LA-UR—83-1076
	8:34567	Journal of Wildlife Management 46 NO. 3. 835-838 (1982).
	8:34617	LA-UR—83-1151
	8:34696	LA-UR—83-1014
	8:34854	LA-UR—83-1197
	8:34864	LA-UR—83-995
	8:34865	LA-UR—83-1027
	8:34928	LA-UR—83-999
	8:34929	LA-UR—83-1087
	8:34930	LA-UR—83-1152
	8:34931	LA-UR—83-1175
	8:34959	LA-UR—83-1201
	8:34960	LA-UR—83-1226
	8:34961	LA-UR—83-1275
W-7405-ENG-48	**Lawrence Livermore National Lab., CA (USA)**	
	8:32996	UCRL—87611-Rev.2
	8:33070	UCRL—87650-Rev.1
	8:33179	UCID—19694
	8:33234	UCID—19764
	8:33261	ACS Symposium Series NO. 177. 71-95 (1982).
	8:33693	Atomkernenergie/Kerntechnik 40 NO. 1. 23-30 (1982).
	8:33768	UCID—19704
	8:33769	UCID—19705
	8:33770	UCRL—86230
	8:33779	UCRL—89085
	8:33970	UCRL—88485
	8:33971	UCRL—88486
	8:33976	
	8:33989	Wear 75 21-40 (1982).
	8:33992	Metallurgical Transactions, [Section] B: Process Metallurgy 12B 299-309 (Jun 1981).
	8:33999	UCRL-Trans—11857(May 1983).
	8:34060	UCID—19796
	8:34066	Microchemical Journal 27 200-209 (1982).
	8:34082	Microchemical Journal 26 426-435 (1981).
	8:34093	UCRL—15527
	8:34101	Chemical Physics Letters 85 NO. 4. 434-436 (22 Jan 1982).
	8:34104	Inorganic Chemistry 21 103-107 (1982).
	8:34105	Journal of Physics and Chemistry of Solids 43 NO. 1. 73-79 (1982).
	8:34115	Organometallics 1 NO. 3. 435-440 (1982).
	8:34116	Journal of Chemical and Engineering Data 27 NO. 2. 169-173 (1982).
	8:34119	Chemical Physics Letters 81 NO. 1. 70-74 (1 Jul 1981).
	8:34123	Chemical Physics Letters 77 NO. 3. 589-592 (1 Feb 1981).
	8:34124	Chemical Physics Letters 77 NO. 1. 168-171 (1 Jan 1981).
	8:34133	Surface Science 102 463-485 (1981).
	8:34138	Journal of Solution Chemistry 10 NO. 12. 831-846 (1981).
	8:34166	Journal of Chemical and Engineering Data 26 NO. 2. 234-235 (1981).
	8:34181	Journal of Electron Spectroscopy and Related Phenomena 26 43-51 (1982).
	8:34192	Journal of Electroanalytical Chemistry 109 95-114 (1980).
	8:34193	Journal of Electroanalytical Chemistry 109 95-114 (1980).
	8:34207	Organometallics 1 NO. 4. 618-622 (1982).
	8:34214	UCID—19795
	8:34215	UCRL—89005
	8:34249	UCID—19749
	8:34250	UCRL—88555
	8:34251	UCRL—89100
	8:34252	IEEE Computer Graphics and Applications 15-23 (Apr 1981).
	8:34293	UCID—19673
	8:34294	UCRL—88260
	8:34392	Propellants and Explosives 6 1-4 (1981).
	8:34406	UCID—18874-80-Vol.1
	8:34407	UCID—18874-80-Vol.2
	8:34408	UCID—18874-80-Vol.3
	8:34731	International Journal of Quantum Chemistry, Symposium 15 703-714 (1981).
	8:34742	Annual Review of Physical Chemistry 32 311-329 (1981).
	8:34824	UCRL—89024
	8:34861	UCID—19791
	8:34887	Electromagnetics 1 29-49 (1981).
	8:34908	UCRL-Trans—11858(May 1983).
	8:34940	UCID—18865-Vol.1
	8:34941	UCID—18865-Vol.2
	8:34942	UCID—18865-Vol.3
	8:34943	UCRL—50021-81
	8:34944	UCRL—50051-82-3
	8:34945	UCRL—53333
	8:34946	UCRL—53384
	8:34947	UCRL—88211
	8:34948	UCRL—88215
	8:34949	UCRL—88232
	8:34950	UCRL—88704
	8:34967	UCID—19793
	8:34968	UCRL—53404
	8:34969	UCRL—88558

Contract No.	*Abstract No.*	*Report No.*
	8:34975	Computer Graphics and Image Processing 17 189-210 (1981).

Contract No.	*Abstract No.*	*Report No.*
W-7405-ENG-82	**Ames Lab., IA**	
	8:34107	Journal of Organometallic Chemistry (Amsterdam) 225 253-263 (1982).
	8:34152	Chemical Physics (Amsterdam) 64 83-93 (1982).

REPORT NUMBER INDEX

The numbers assigned to all reports cited in the publication appear in the first column of the index. Cross reference information and/or availability are included as appropriate. Abbreviations used in the availability column are elaborated at the end of the index. To expedite the filling of orders for reports from NTIS and TIC, an order number in the form, DE82000001, appears in column 3. Requesters are urged to use this order number where provided. In column 4, one or more DOE distribution categories are indicated, e.g. , STD-10, MN-25. STD indicates distribution was made in full-size copy; MN indicates microcopy distribution. These category numbers are included to assist DOE librarians in responding to requests for reports in their collections. The UC (Unclassified Distribution Categories) are defined in DOE/TIC-4500, available from TIC. The citation numbers are given in column 5. NOTE: DOE attempts to disseminate its information as broadly as possible. Even though a report may contain some degree of illegibility, it is believed that the report may still make a contribution. The presence of a 1, 2, or 3 following NTIS in the availability column denotes the extent to which a report may be illegible and the form in which it is available: 1 = 1 to 5% illegibility, available PC and MF; 2 = 6 to 10% illegibility, available MF only; 3 = 11% or more illegibility, available PC only.

Report No.	*Availability*	*Order No.*	*Distribution Category*	*Abstract No.*
A-				
8981	*See* N-8231727			8:34395
AD-A-				
120944/4	NTIS, PC A10/MF A01			8:34666
121185/3	NTIS, PC A02/MF A01			8:34476
121284/4	NTIS, PC A06/MF A01			8:34612
121289/3	NTIS, PC A02/MF A01			8:34571
121329/7	NTIS, PC A06/MF A01			8:34439
121482/4	NTIS, PC A04/MF A01			8:34393
124046/4	NTIS, PC A05/MF A01			8:34210
AD-P-				
000282/4	NTIS, PC A02/MF A01			8:34087
000284/0	NTIS, PC A02/MF A01			8:34088
000308/7	NTIS, PC A02/MF A01			8:34211
000310/3	NTIS, PC A02/MF A01			8:33274
000312/9	NTIS, PC A02/MF A01			8:33264
ANL-				
82-58	NTIS, PC A07/MF A01	DE83011014	STD -70	8:33189
82-59	NTIS, PC A08/MF A01; 1	DE83011919	STD -93	8:34262
82-78	NTIS, PC A08/MF A01; 1	DE83011920	STD -70	8:33190
82-89	NTIS, PC A05/MF A01	DE83011932	STD -59c	8:33548
83-2	NTIS, PC A13/MF A01	DE83011291	STD -79d	8:33701
83-21	NTIS, PC A02/MF A01	DE83011925	STD -70	8:33191
ANL/CNSV-TM-				
112	NTIS, PC A04/MF A01	DE83011658	MN -95e	8:33938
113	NTIS, PC A07/MF A01	DE83012463	MN -95e	8:33939
114	NTIS, PC A05/MF A01; 1	DE83011657	MN -95e	8:33940
ANL/EES-TM-				
212-Vol.3	NTIS, PC A18/MF A01; 1	DE83011913	MN -11	8:33800
217	NTIS, PC A11/MF A01; 1	DE83011914	MN -88	8:33071
ANL/ES-				
130	NTIS, PC A21/MF A01; 1	DE83012179	STD -96	8:33923
ANL/FE-				
83-8	NTIS, PC A03/MF A01	DE83011926	STD -90h	8:32942
ANL/FPP/TM-				
171	NTIS, PC A02/MF A01	DE83012305	STD -20g	8:34909
173	NTIS, PC A03/MF A01	DE83012381	STD -20	8:34910
ANL-HEP-CP-				
82-67	NTIS, PC A02/MF A01	DE83010708	MN -34D	8:34745
ANL/MCS-TM-				
6	NTIS, PC A03/MF A01	DE83011948	MN -32	8:34935
ASCOT-				
83-1-Vol.1	*See* UCID-18874-80-Vol.1	DE83011880	MN -11	8:34406
83-1-Vol.2	*See* UCID-18874-80-Vol.2	DE83011879	MN -11	8:34407
83-1-Vol.3	*See* UCID-18874-80-Vol.3	DE83011886	MN -11	8:34408
BDX-				
613-2872	NTIS, PC A02/MF A01	DE83011552	MN -38	8:34341
613-2938	NTIS, PC A02/MF A01	DE83011123	MN -41	8:34253
BHARC-				
400/83/004	*See* NUREG/CR-3217	DE83011857	MN -80	8:33730
BM-IC-				
8898	*See* PB-83-157685			8:33078
8899	*See* PB-83-156794			8:33077
BMFT-FB-HA-				
82-018	NTIS (US Sales Only), PC A04/MF A01	DE83750114	MN -94b	8:33946
82-019	NTIS (US Sales Only), PC A05/MF A01	DE83750079	MN -95	8:33930
BMFT-FB-K-				
82-001	NTIS (US Sales Only), PC A05/MF A01	DE83750099	MN -80	8:33727
82-002	NTIS (US Sales Only), PC A04/MF A01	DE83750062	MN -78	8:33666
82-003	NTIS (US Sales Only), PC A78/MF A01	DE83750060	MN -78	8:33663

Report No.	Availability	Order No.	Distribution Category	Abstract No.
82-004	NTIS (US Sales Only), PC A04/MF A01	DE83750098	MN -78	8:33664
82-005	NTIS (US Sales Only), PC A04/MF A01	DE83750100	MN -78	8:33687
82-006	NTIS (US Sales Only), PC A03/MF A01	DE83750099	MN -78	8:33667
82-007	NTIS (US Sales Only), PC A08/MF A01	DE83750084	MN -78	8:33702
82-008	NTIS (US Sales Only), PC A09/MF A01	DE83750083	MN -78	8:33703
BMFT-FB-M-				
82-001	NTIS (US Sales Only), PC A13/MF A01	DE83750082	MN -13	8:33578
BMFT-FB-T-				
82-116	NTIS (US Sales Only), PC A02/MF A01	DE83750058	MN -48	8:34613
82-119	NTIS (US Sales Only), PC A08/MF A01	DE83750071	MN -38	8:34242
82-120	NTIS (US Sales Only), PC A03/MF A01	DE83750070	MN -38	8:34243
82-151-Vol.1	NTIS (US Sales Only), PC A21/MF A01	DE83750094	MN -95e	8:33931
82-151-Vol.2	NTIS (US Sales Only), PC A06/MF A01	DE83750093	MN -95e	8:33932
82-152	NTIS (US Sales Only), PC A05/MF A01	DE83750088	MN -51	8:34674
82-153	NTIS (US Sales Only), PC A05/MF A01	DE83750091	MN -38	8:34244
82-155	NTIS (US Sales Only), PC A06/MF A01	DE83750085	MN -38	8:34245
82-156	NTIS (US Sales Only), PC A10/MF A01	DE83750090	MN -95d	8:33887
82-157	NTIS (US Sales Only), PC A03/MF A01	DE83750089	MN -25	8:33954
82-158	NTIS (US Sales Only), PC A04/MF A01	DE83750080	MN -37	8:34385
82-159	NTIS (US Sales Only), PC A11/MF A01	DE83750067	MN -92	8:34216
82-160	NTIS (US Sales Only), PC A05/MF A01	DE83750087	MN -66a	8:33554
82-161	NTIS (US Sales Only), PC A07/MF A01	DE83750092	MN -04	8:34089
82-162	NTIS (US Sales Only), PC A05/MF A01	DE83750113	MN -38	8:34258
82-164	NTIS (US Sales Only), PC A02/MF A01	DE83750068	MN -97a	8:33627
82-167	NTIS (US Sales Only), PC A03/MF A01	DE83750081	MN -93	8:33881
82-168	NTIS (US Sales Only), PC A04/MF A01	DE83750066	MN -60	8:33585
82-169	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750115	MN -97c	8:33616
82-170	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750078	MN -38	8:32943
82-171	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750086	MN -62	8:33549
83-001	NTIS (US Sales Only), PC A13/MF A01; 1	DE83750857	MN -98F	8:33824
83-002	NTIS (US Sales Only), PC A03/MF A01	DE83750860	MN -98F	8:33825
83-003	NTIS (US Sales Only), PC A05/MF A01	DE83750865	MN -90d	8:32944
83-008	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750858	MN -97c	8:33617
83-009	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750866	MN -90c	8:33014
83-010	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750859	MN -92b	8:33137
83-011	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750856	MN -95d	8:33888
83-013	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750862	MN -95d	8:33889
83-016	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750861	MN -94ca	8:33782
83-020	NTIS (US Sales Only), PC A10/MF A01; 1	DE83750868	MN -94a	8:33780
83-025	NTIS (US Sales Only), PC A06/MF A01	DE83750869	MN -96	8:33947
83-027	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750870	MN -25	8:34019
83-036	NTIS (US Sales Only), PC A15/MF A01; 1	DE83750867	MN -61c	8:33319
BNL-				
32651	NTIS, PC A02/MF A01	DE83012076	MN -25	8:34013
32658	NTIS, PC A02/MF A01; 1	DE83011653	MN -28	8:34263
32680	NTIS, PC A02/MF A01	DE83008591	MN -4	8:34177
32730	NTIS, PC A02/MF A01; 1	DE83011353	MN -28	8:34281
32770	NTIS, PC A02/MF A01	DE83011360	MN -28	8:34299
32788	NTIS, PC A02/MF A01; 1	DE83011648	MN -37	8:34352
32828	NTIS, PC A03/MF A01	DE83012074	MN -95d	8:33890
32843	NTIS, PC A02/MF A01	DE83011361	MN -37	8:34300
32847	NTIS, PC A02/MF A01; 1	DE83011364	MN -37	8:34353
32849	NTIS, PC A02/MF A01; 1	DE83011352	MN -37	8:34301
32855	NTIS, PC A03/MF A01; 1	DE83011647	MN -34D	8:34746
32891	NTIS, PC A02/MF A01	DE83011624	MN -48	8:34511
32898	NTIS, PC A03/MF A01; 1	DE83011623	MN -38	8:34052
32901	NTIS, PC A02/MF A01; 1	DE83012216	MN -34D	8:34747
32902	NTIS, PC A02/MF A01; 1	DE83011640	MN -34C	8:34831
32904	NTIS, PC A02/MF A01; 1	DE83011642	MN -28	8:34302
32905	NTIS, PC A02/MF A01	DE83011620	MN -48	8:34512
32910	NTIS, PC A02/MF A01; 1	DE83011650	MN -28	8:34697
32920	NTIS, PC A03/MF A01	DE83012212	MN -34D	8:34748
32929	NTIS MF A01; 2	DE83011641	MN -28	8:34303
51622	NTIS, PC A06/MF A01; 1	DE83012270	STD -95d	8:33891
BNL-NCS-				
51647	NTIS, PC A08/MF A01	DE83011768	STD -34C	8:34789
51655	NTIS, PC A03/MF A01; 1	DE83011769	STD -34C	8:34790
BNL-NUREG-				
32798	NTIS, PC A02/MF A01; 1	DE83011358	MN -78	8:33668
32824	NTIS, PC A02/MF A01	DE83012073	MN -25	8:33955
32897	NTIS, PC A02/MF A01 - GPO	DE83011651	MN -38	8:34230
51620	*See* NUREG/CR-3013	DE83011868	MN -78	8:33764
BONN-HE-				
82-6	NTIS (US Sales Only), PC A02/MF A01	DE83750056	MN -37	8:34851
82-7	NTIS (US Sales Only), PC A02/MF A01	DE83750108	MN -34C	8:34791
82-9	NTIS (US Sales Only), PC A03/MF A01	DE83750105	MN -34D	8:34755
82-11	NTIS (US Sales Only), PC A02/MF A01	DE83750106	MN -34D	8:34749
82-12	NTIS (US Sales Only), PC A02/MF A01	DE83750107	MN -28	8:34304
CBI-F-				
2-81	NTIS (US Sales Only), PC A04/MF A01	DE83750469	MN -90i	8:33017
CBPF-NF-				
047/ 81	NTIS (US Sales Only), PC A02/MF A01	DE83701209	MN -34A	8:34862
CE-TR-				
7892	NTIS (US Sales Only), PC A02/MF A01; 1	DE83901739	MN -78	8:33681

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-7411121-	(NSF-OCR engineering workshop on MHD materials, Cambridge, MA, USA, 20-22 Nov 1974)			
2	NTIS, PC A02/MF A01; 1	DE83008576	MN -90g	8:33878
CONF-790171-	(Ocean thermal energy conversion cold water pipe workshop, Laurel, MD, USA, 17-18 Jan 1979)			
(Vol.1)	*See* DOE/NOAA/OTEC-24(Vol.1)	DE83011600	STD -64	8:33403
CONF-7903106-	(Technical symposium on emergency power supply, Muenchen, F.R. Germany, 29-30 Mar 1979)			
	Muenchen, Germany, F.R.; Deutsches Museum von Meisterwerken der Naturwissenschaft und Technik (1979).			8:33784
CONF-791058-	(International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22-26 Oct 1979)			
	NBS Spec. Publ. (U.S.), No. 594, 458-463(Sep 1980)			8:33258
	NBS Spec. Publ. (U.S.), No. 594, 576-580(Sep 1980)			8:33690
	NBS Spec. Publ. (U.S.), No. 594, 581-585(Sep 1980)			8:33691
	NBS Spec. Publ. (U.S.), No. 594, 916-919(Sep 1980)			8:33775
	NBS Spec. Publ. (U.S.), No. 594, 516-520(Sep 1980)			8:34085
	NBS Spec. Publ. (U.S.), No. 594, 429-432(Sep 1980)			8:34280
	NBS Spec. Publ. (U.S.), No. 594, 531-533(Sep 1980)			8:34350
	NBS Spec. Publ. (U.S.), No. 594, 534-536(Sep 1980)			8:34351
	NBS Spec. Publ. (U.S.), No. 594, 433-435(Sep 1980)			8:34380
	NBS Spec. Publ. (U.S.), No. 594, 509-511(Sep 1980)			8:34381
	NBS Spec. Publ. (U.S.), No. 594, 947-955(Sep 1980)			8:34382
	NBS Spec. Publ. (U.S.), No. 594, 988-989(Sep 1980)			8:34383
	NBS Spec. Publ. (U.S.), No. 594, 604-614(Sep 1980)			8:34390
	NBS Spec. Publ. (U.S.), No. 594, 440-446(Sep 1980)			8:34558
	NTIS, PC A99/MF A01; 1 - GPO $21.00	DE83009849		8:34794
	NBS Spec. Publ. (U.S.), No. 594, 521-523(Sep 1980)			8:34796
	NBS Spec. Publ. (U.S.), No. 594, 394-396(Sep 1980)			8:34798
	NBS Spec. Publ. (U.S.), No. 594, 48-51(Sep 1980)			8:34801
	NBS Spec. Publ. (U.S.), No. 594, 84-85(Sep 1980)			8:34802
	NBS Spec. Publ. (U.S.), No. 594, 101-104(Sep 1980)			8:34803
	NBS Spec. Publ. (U.S.), No. 594, 804-806(Sep 1980)			8:34804
	NBS Spec. Publ. (U.S.), No. 594, 985-987(Sep 1980)			8:34805
	NBS Spec. Publ. (U.S.), No. 594, 408-412(Sep 1980)			8:34810
	NBS Spec. Publ. (U.S.), No. 594, 135-138(Sep 1980)			8:34812
	NBS Spec. Publ. (U.S.), No. 594, 146-149(Sep 1980)			8:34813
	NBS Spec. Publ. (U.S.), No. 594, 155-158(Sep 1980)			8:34814
	NBS Spec. Publ. (U.S.), No. 594, 163-167(Sep 1980)			8:34815
	NBS Spec. Publ. (U.S.), No. 594, 853-856(Sep 1980)			8:34816
	NBS Spec. Publ. (U.S.), No. 594, 890-892(Sep 1980)			8:34817
	NBS Spec. Publ. (U.S.), No. 594, 980-984(Sep 1980)			8:34818
	NBS Spec. Publ. (U.S.), No. 594, 173-176(Sep 1980)			8:34820
	NBS Spec. Publ. (U.S.), No. 594, 857-861(Sep 1980)			8:34821
	NBS Spec. Publ. (U.S.), No. 594, 348-350(Sep 1980)			8:34826
	NBS Spec. Publ. (U.S.), No. 594, 775-777(Sep 1980)			8:34827
	NBS Spec. Publ. (U.S.), No. 594, 778-782(Sep 1980)			8:34828
	NBS Spec. Publ. (U.S.), No. 594, 877(Sep 1980)			8:34829
	NBS Spec. Publ. (U.S.), No. 594, 907(Sep 1980)			8:34830
	NBS Spec. Publ. (U.S.), No. 594, 340-343(Sep 1980)			8:34833
	NBS Spec. Publ. (U.S.), No. 594, 93-96(Sep 1980)			8:34836
	NBS Spec. Publ. (U.S.), No. 594, 488-490(Sep 1980)			8:34837
	NBS Spec. Publ. (U.S.), No. 594, 500-503(Sep 1980)			8:34838
	NBS Spec. Publ. (U.S.), No. 594, 692-697(Sep 1980)			8:34839
	NBS Spec. Publ. (U.S.), No. 594, 715-719(Sep 1980)			8:34840
	NBS Spec. Publ. (U.S.), No. 594, 908(Sep 1980)			8:34841
	NBS Spec. Publ. (U.S.), No. 594, 961-965(Sep 1980)			8:34842
	NBS Spec. Publ. (U.S.), No. 594, 966-970(Sep 1980)			8:34843
	NBS Spec. Publ. (U.S.), No. 594, 990-994(Sep 1980)			8:34844
	NBS Spec. Publ. (U.S.), No. 594, 995-999(Sep 1980)			8:34845
	NBS Spec. Publ. (U.S.), No. 594, 762-764(Sep 1980)			8:34849
	NBS Spec. Publ. (U.S.), No. 594, 793-795(Sep 1980)			8:34850
	NBS Spec. Publ. (U.S.), No. 594, 397-407(Sep 1980)			8:34858
	NBS Spec. Publ. (U.S.), No. 594, 563-567(Sep 1980)			8:34859
CONF-7911183-	(18. nuclear medicine days conference, Gottwaldov, Czechoslovakia, 14-16 Nov 1979)			
Abstr.	*See* INIS-mf-7133	DE83780455	MN -48	8:34513
CONF-800155-	(6. Brazilian symposium on theoretical physics, Rio de Janeiro, Brazil, 7-18 Jan 1980)			
Vol.1	*See* INIS-mf-7626(Vol.1)	DE83780489	MN -34	8:34878
Vol.2	*See* INIS-mf-7626(Vol.2)	DE83780490	MN -34	8:34722
Vol.3	*See* INIS-mf-7626(Vol.3)	DE83780486	MN -34	8:34781
CONF-8002104-	(6. meeting of business experts, Augsburg, F.R. Germany, 27 Feb 1980)			
1	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770046	MN -92	8:33851
CONF-8006246-	(Seminar on nuclear law, Rio de Janeiro, Brazil, 9-13 Jun 1980)			
1	Rio de Janeiro, Brazil; Comissao Nacional de Energia Nuclear do Brazil (1980).			8:33700
2	Sao Paulo, Brazil; Companhia Energetica (1980).			8:34421
3	Rio de Janeiro, Brazil; NUCLEBRAS (1980).			8:33777
4	Rio de Janeiro, Brazil; Instituto de Resseguros do Brazil (1980).			8:33778
5	Rio de Janeiro, Brazil; Comissao Nacional de Energia Nuclear do Brazil (1980).			8:33820

Report No.	Availability	Order No.	Distribution Category	Abstract No.
6	Rio de Janeiro, Brazil; Companhia de Pesquisa de Recursos Minerais (1980).			8:33850
CONF-8009279-	(International conference on harvesting and utilization of wood for energy purposes, Elmia, Joenkoeping, Sweden, 29-30 Sep 1980)			
	See NE-SBT-81-9	DE83750546	MN -61a	8:33339
CONF-8010301-	(Joint IEA/IUFRO forestry energy workshop, Garpenberg, Sweden, 2 Oct 1980)			
	See NE-SBT-81-7	DE83750547	MN -61a	8:33338
CONF-8012110-	(Meeting on wave data for wave energy, Trondheim, Norway, 1-3 Dec 1980)			
	See NE-TEKNIK-81-11	DE83750541	MN -64	8:33581
CONF-810468-	(3. international conference on electrostatic accelerator technology, Oak Ridge, TN, USA, 13-16 Apr 1981)			
	Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, Piscataway, NJ 08854			8:34324
CONF-8104136-	(2. Brazilian energy congress, Rio de Janeiro, Brazil, 6-10 Apr 1981)			
Vol.A	*See* INIS-mf-7475-Vol.A	DE83780432	MN -2	8:34951
CONF-8104202-	(Workshop on skin painting technology for safety evaluation, Washington, DC, USA, 28 Apr 1981)			
1	NTIS, PC A03/MF A01; 1	DE83010700	MN -48	8:34616
CONF-8105102-	(International symposium on osteoporosis, Jerusalem, Israel, 31 May-5 Jun 1981)			
2	*See* BNL-32905	DE83011620	MN -48	8:34512
CONF-8105201-	(7. annual meeting of the OeSRAD on radioactivity of building materials, Vienna, Austria, 1 May 1981)			
	See INIS-mf-7605	DE83780517	MN -41	8:34425
CONF-8105209-	(All-union seminar electromagnetic interactions of hadrons in the resonance energy range, Khar'kov, Ukrainian SSR, 26-28 May 1981)			
	See INIS-SU-152	DE83780520	MN -34D	8:34763
CONF-8105214-	(International workshop policy issues in Ethiopian energy development, Nazareth, Ethiopia, 15-18 May 1981)			
	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750483	MN -61a	8:33320
CONF-810622-	(8. ocean energy conference, Washington, DC, USA, 7-11 Jun 1981)			
Vol.2	NTIS, PC A24; 3	DE83003789	ND -64	8:33366
CONF-810766-	(Conference on differential geometric methods in theoretical physics, Trieste, Italy, 1-3 Jul 1981)			
Absts.	*See* IC-81/95	DE83701195	MN -34D	8:34890
CONF-8107105-	(4. internattional seminar on high energy physics and quantum field theory, Protvino, USSR, 1 Jul 1981)			
Vol.1	*See* INIS-SU-157	DE83780521	MN -34D	8:34743
CONF-8108162-	(Summer institute on particle physics meeting, Stanford, CA, USA, 1 Aug 1981)			
1	*See* SLAC-PUB-2857	DE83011839	MN -34D	8:34788
CONF-810925-	(6. national passive solar conference, Portland, OR, USA, 8-12 Sep 1981)			
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 397-401(1981)			8:33280
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 402-404(1981)			8:33281
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 409-413(1981)			8:33282
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 218-222(1981)			8:33296
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 571-573(1981)			8:33297
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 467-470(1981)			8:33310
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 476-480(1981)			8:33311
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 481-483(1981)			8:33312
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 489-493(1981)			8:33313
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 542-546(1981)			8:33314
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 552-556(1981)			8:33315
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 557-561(1981)			8:33316
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 574-577(1981)			8:33317
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 581-583(1981)			8:33318
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 661-663(1981)			8:33363
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 726-729(1981)			8:33364
	Publishing Office of the American Section of the International Solar Energy Society, Inc., 205B McDowell Hall, Univ. of Delaware, Newark 19711			8:33413

Report No.	Availability	Order No.	Distribution Category	Abstract No.
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 3-7(1981)			8:33414
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 8-12(1981)			8:33415
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 15-19(1981)			8:33416
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 20-24(1981)			8:33417
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 25-29(1981)			8:33418
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 30-34(1981)			8:33419
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 35-38(1981)			8:33420
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 39-43(1981)			8:33421
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 49-53(1981)			8:33422
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 54-58(1981)			8:33423
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 59-63(1981)			8:33424
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 69-73(1981)			8:33425
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 98-101(1981)			8:33426
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 102-106(1981)			8:33427
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 107-111(1981)			8:33428
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 112-115(1981)			8:33429
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 116-120(1981)			8:33430
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 121-125(1981)			8:33431
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 126-130(1981)			8:33432
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 131-135(1981)			8:33433
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 136-140(1981)			8:33434
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 163-167(1981)			8:33435
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 168-172(1981)			8:33436
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 173-177(1981)			8:33437
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 183-187(1981)			8:33438
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 188-191(1981)			8:33439
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 192-194(1981)			8:33440
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 200-204(1981)			8:33441
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 205-209(1981)			8:33442
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 228-231(1981)			8:33443
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 232-236(1981)			8:33444
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 237-241(1981)			8:33445
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 242-245(1981)			8:33446
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 246-250(1981)			8:33447
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 251-255(1981)			8:33448
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 261-265(1981)			8:33449
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 271-275(1981)			8:33450
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 284-288(1981)			8:33451
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 289-293(1981)			8:33452
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 294-297(1981)			8:33453
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 298-302(1981)			8:33454
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 303-307(1981)			8:33455

Report No.	Availability	Order No.	Distribution Category	Abstract No.
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 308-312(1981)			8:33456
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 313-317(1981)			8:33457
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 318-322(1981)			8:33458
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 323-327(1981)			8:33459
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 328-332(1981)			8:33460
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 338-342(1981)			8:33461
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 343-347(1981)			8:33462
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 348-352(1981)			8:33463
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 353-357(1981)			8:33464
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 358-361(1981)			8:33465
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 362-366(1981)			8:33466
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 372-376(1981)			8:33467
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 377-381(1981)			8:33468
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 382-386(1981)			8:33469
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 387-391(1981)			8:33470
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 392-396(1981)			8:33471
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 405-408(1981)			8:33472
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 417-418(1981)			8:33473
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 419-422(1981)			8:33474
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 423-425(1981)			8:33475
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 431-435(1981)			8:33476
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 436-440(1981)			8:33477
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 446-449(1981)			8:33478
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 450-454(1981)			8:33479
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 457-461(1981)			8:33480
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 462-466(1981)			8:33481
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 484-488(1981)			8:33482
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 494-497(1981)			8:33483
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 503-507(1981)			8:33484
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 511-513(1981)			8:33485
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 514-518(1981)			8:33486
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 519-523(1981)			8:33487
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 524-528(1981)			8:33488
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 529-533(1981)			8:33489
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 537-541(1981)			8:33490
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 547-551(1981)			8:33491
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 570(1981)			8:33492
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 578-580(1981)			8:33493
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 584-586(1981)			8:33494
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 587-589(1981)			8:33495
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 590-594(1981)			8:33496
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 597-601(1981)			8:33497

Report No.	Availability	Order No.	Distribution Category	Abstract No.
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 607-610(1981)			8:33498
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 611-615(1981)			8:33499
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 616-620(1981)			8:33500
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 621-625(1981)			8:33501
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 631-635(1981)			8:33502
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 636-640(1981)			8:33503
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 641-645(1981)			8:33504
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 653-657(1981)			8:33505
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 664-668(1981)			8:33506
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 669-671(1981)			8:33507
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 672-674(1981)			8:33508
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 675-679(1981)			8:33509
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 680-684(1981)			8:33510
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 685-689(1981)			8:33511
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 690-694(1981)			8:33512
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 695-697(1981)			8:33513
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 698-702(1981)			8:33514
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 703-706(1981)			8:33515
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 707-711(1981)			8:33516
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 712-716(1981)			8:33517
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 717-721(1981)			8:33518
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 734-737(1981)			8:33519
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 742-745(1981)			8:33520
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 749-752(1981)			8:33521
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 753-757(1981)			8:33522
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 758-762(1981)			8:33523
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 763-767(1981)			8:33524
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 768-772(1981)			8:33525
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 778-782(1981)			8:33526
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 793-797(1981)			8:33527
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 798-801(1981)			8:33528
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 802-806(1981)			8:33529
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 809-813(1981)			8:33530
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 814-816(1981)			8:33531
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 817-821(1981)			8:33532
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 822-826(1981)			8:33533
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 827-831(1981)			8:33534
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 860-864(1981)			8:33536
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 880-884(1981)			8:33537
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 89-92(1981)			8:33544
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 149-153(1981)			8:33545
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 154-158(1981)			8:33546

Report No.	Availability	Order No.	Distribution Category	Abstract No.
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 159-162(1981)			8:33547
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 471-475(1981)			8:33849
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 146-148(1981)			8:33906
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 195-199(1981)			8:33907
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 223-227(1981)			8:33908
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 256-260(1981)			8:33909
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 441-445(1981)			8:33910
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 498-502(1981)			8:33911
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 508-510(1981)			8:33912
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 602-606(1981)			8:33913
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 626-630(1981)			8:33914
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 651-652(1981)			8:33915
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 722-725(1981)			8:33916
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 738-741(1981)			8:33917
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 837-841(1981)			8:33918
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 845-849(1981)			8:33919
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 865-869(1981)			8:33920
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 870-874(1981)			8:33921
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 875-879(1981)			8:33922
	Proc. Annu. Meet. - Am. Sect. Int. Sol. Energy Soc., 6: 646-650(1981)			8:33945
CONF-8109188-	(Conference on aerosols in science and technology - aerosols in and from in and from industrial processes, Duisburg, F.R. Germany, 23-25 Sep 1981)			
Vol.2	*See* INIS-mf-7685	DE83780503	MN -11	8:33184
CONF-8109213-	(Conference on nuclear methods in mining, geology, geophysics and geochemistry, Bolebor, Czechoslovakia, 7-11 Sep 1981)			
Summ.	*See* INIS-mf-7751	DE83780524	MN -2	8:34675
CONF-8109216-	(Contact conference on acidification, Joenkoeping, Sweden, 15-17 Sep 1981)			
Vol.1	NTIS (US Sales Only), PC A15/MF A01; 1	DE83750466	MN -11	8:33060
CONF-811174-	(2. convention of the international colloquium on drops and bubbles, Monterey, CA, USA, 19-21 Nov 1981)			
6	NTIS, PC A02/MF A01; 1	DE83011258	MN -21	8:34911
CONF-820120-	(International workshop on gross properties of nuclei and nuclear excitation, Hirschegg, Kleinwalsertal, Austria, 18-23 Jan 1982)			
	See INIS-mf-7678	DE83780492	MN -34D	8:34761
CONF-820144-	(National Association of Corrosion Engineers conference on corrosion-erosion-wear of materials in emerging fossil energy systems, Berkeley, CA, USA, 27-29 Jan 1982)			
	NTIS, PC A99/MF A01	DE83009716		8:33976
CONF-820265-	(American Psychological Association mid-winter convention, Monterey, CA, USA, 25-27 Feb 1982)			
1-Rev.	*See* LBL-14846-Rev.	DE83011688	MN -41	8:33750
CONF-820331-	(3. conference on gaseous dielectrics, Knoxville, TN, USA, 7-11 Mar 1982)			
	NTIS, PC A25/MF A01; 1	DE83006090	MN -97	8:34020
CONF-820371-	(17. Rencontre de Moriond meeting, Les Arcs, Savoie, France, 14-26 Mar 1982)			
7	*See* BONN-HE-82-11	DE83750106	MN -34D	8:34749
9	NTIS, PC A02/MF A01	DE83011078	MN -34D	8:34766
CONF-8203124-	(Meeting of experts on integration of wind power into national electricity supply systems, Juelich, F.R. Germany, 8-9 Mar 1982)			
	See Juel-Spez-155	DE83750377	MN -60	8:33593
CONF-820418-	(UCC-ND and GAT environmental protection seminar, Gatlinburg, TN, USA, 5-7 Apr 1982)			
	NTIS, PC A23/MF A01; 1	DE83010617	STD -11	8:34449
CONF-820434-	(6. international conference on positron annihilation, Arlington, TX, USA, 3-7 Apr 1982)			
20	NTIS, PC A02/MF A01; 1	DE83010773	MN -25	8:33956
CONF-820439-	(Symposium on genetic mechanisms of carcinogenesis, Gatlinburg, TN, USA, 11-15 Apr 1982)			
7	NTIS, PC A02/MF A01; 1	DE83012061	MN -48	8:34572

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-820448-	(Banbury conference on genotoxic indications of exposures in men, Cold Spring Harbor, NY, USA, 18-21 Apr 1982)			
5	NTIS, PC A02/MF A01; 1	DE83010719	MN -48	8:34615
CONF-820475-	(Conference on new horizons on electromagnetic physics, Charlottesville, VA, USA, 21-24 Apr 1982)			
4	*See* BONN-HE-82-7	DE83750108	MN -34C	8:34791
CONF-8204100-	(RAL workshop on astronomy and astrophysics, Abingdon, UK, 26-28 Apr 1982)			
	See RL-82-075	DE83780485	MN -34B	8:34692
CONF-8204128-	(ASTM conference on environment-sensitive fracture: evaluation and comparison of test methods, Washington, DC, USA, 1 Apr 1982)			
1	*See* BNL-NUREG-32798	DE83011358	MN -78	8:33668
CONF-820551-	(EPA/EPRI symposium on flue gas desulfurization, Hollywood, FL, USA, 17-20 May 1982)			
Vol.1	*See* EPRI-CS-2897-Vol.1	DE83901965	MN -90i	8:33022
CONF-820594-	(Conference on individual susceptibility to genotoxic agents in the human population, Research Triangle Park, NC, USA, 10-12 May 1982)			
2	NTIS, PC A02/MF A01	DE83012099	MN -48	8:34573
CONF-8205140-	(International conference on microbial enhancement of oil recovery, Afton, OK, USA, 16-21 May 1982)			
	NTIS, PC A10/MF A01; 1	DE83009741	STD -92a	8:33104
CONF-8205184-	(International colloquium of mathematics in the natural sciences, Luminy, France, 1 May 1982)			
1	*See* LBL-15651	DE83011672	MN -32	8:34962
CONF-820610-	(American Institute of Chemical Engineers' spring meeting, Anaheim, CA, USA, 8-10 Jun 1982)			
7-Rev.1	*See* UCRL-87650-Rev.1	DE83012049	MN -90c	8:33070
10-Rev.2	*See* UCRL-87611-Rev.2	DE83011228	MN -90c	8:32996
CONF-8206186-	(22. Krakow school of theoretical physics, Zakopane, Poland, 1 Jun 1982)			
1	*See* FERMILAB-Pub-83/25-THY	DE83011059	MN -34D	8:34758
CONF-820718-	(21. international conference on high energy physics, Paris, France, 29 Jul-8 Aug 1982)			
37	*See* BNL-32920	DE83012212	MN -34D	8:34748
CONF-820730-	(TVA southeast region biomass research conference, Muscle Shoals, AL, USA, 12-13 Jul 1982)			
Summ.	NTIS	DE83901782	MN -61a	8:33874
CONF-820834-	(3. AAPG circum-Pacific Energy and Materials conference (Fractures in geothermal reservoirs), Honolulu, HI, USA, 22-28 Aug 1982)			
6	*See* BNL-32828	DE83012074	MN -95d	8:33890
CONF-820840-	(8. underground coal conversion symposium, Keystone, CO, USA, 15-19 Aug 1982)			
	See SAND-82-2355	DE83006261	MN -90c	8:32961
CONF-8208132-	(Summer school on Gamow cosmology, Varenna, Italy, 1 Aug 1982)			
1	*See* DOE/ER/40048-23P2	DE83011615	MN -34B	8:34680
CONF-8208133-	(Arctic school of physics, Akaslampalo, Finland, 1-14 Aug 1982)			
1	*See* DOE/ER/40048-26-P2	DE83011617	MN -34D	8:34757
CONF-8208134-	(21. international conference on high energy physics, Paris, France, 1 Aug 1982)			
1	*See* DOE/ER/40048-25-P2	DE83011618	MN -34D	8:34756
CONF-820909-	(National meeting of the American Chemical Society, Kansas City, MO, USA, 1 Sep 1982)			
Vol.1	Am. Chem. Soc., Div. Pet. Chem., Prepr., 27: No. 3, 722-731(Sep 1982)			8:33139
CONF-820971-	(Neutrino conference, Telemark, WI, USA, 22-25 Sep 1982)			
4	NTIS, PC A02/MF A01; 1	DE83011077	MN -34C	8:34767
CONF-8209133-	(International workshop on very high energy gamma ray astronomy, Ootacamund, India, 20-25 Sep 1982)			
1	*See* N-8311010			8:34685
CONF-821023-	(4. international conference on composite materials, Tokyo, Japan, 24-28 Oct 1982)			
2	*See* N-8230336			8:34010
CONF-821038-	(10. annual DOE compatibility conference, Albuquerque, NM, USA, 26-29 Oct 1982)			
9	*See* DP-MS-82-53	DE83012087	MN -25	8:33959
10	*See* DP-MS-82-54	DE83010592	MN -25	8:34015
CONF-821066-	(Symposium for Northeastern Accelerator personnel, Seattle, WA, USA, 6-8 Oct 1982)			
5	*See* BNL-32929	DE83011641	MN -28	8:34303
CONF-8210107-	(Workshop on Drell-Yan processes, Batavia, IL, USA, 7-8 Oct 1982)			
5	*See* ANL-HEP-CP-82-67	DE83010708	MN -34D	8:34745
CONF-8210113-	(American Physical Society meeting on particles and fields, College Park, MD, USA, 28-30 Oct 1982)			
	American Institute of Physics, 335 East 45th St., New York, NY 10017		MN -34D	8:34744
CONF-8210143-	(Symposium on waves on fluid interfaces, Madison, WI, USA, 18-20 Oct 1982)			
1	*See* LBL-15468	DE83012440	MN -34	8:34738

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-821103-	(American Nuclear Society winter meeting, Washington, DC, USA, 14-19 Nov 1982)			
89	*See* DP-MS-82-46	DE83011378	MN -70	8:33202
CONF-821123-	(7. conference on the application of accelerators in research and industry, Denton, TX, USA, 8-10 Nov 1982)			
41	*See* BNL-32910	DE83011650	MN -28	8:34697
CONF-821126-	(5. DOE computer security conference, Knoxville, TN, USA, 16-18 Nov 1982)			
3	*See* DP-MS-82-101	DE83011244	MN -32	8:34957
CONF-821136-	(4. international conference on precipitation scavenging, dry deposition and resuspension, Santa Monica, CA, USA, 29 Nov-3 Dec 1982)			
24	*See* DP-MS-82-86	DE83012126	MN -11	8:34414
CONF-821143-	(High angular momentum properties of nuclei conference, Oak Ridge, TN, USA, 2-4 Nov 1982)			
7	*See* BNL-32902	DE83011640	MN -34C	8:34831
CONF-821185-	(Materials Research Society annual meeting, Boston, MA, USA, 16-19 Nov 1982)			
1	NTIS, PC A02/MF A01	DE83010561	MN -25	8:34042
CONF-821186-	(Institute of Nuclear Power Operations workshop on instrument and control, Atlanta, GA, USA, 1-3 Nov 1982)			
1	*See* DPSP-82-30-14	DE83011243	MN -78	8:33737
CONF-821215-	(DOE environmental protection information meeting, Denver, CO, USA, 7-9 Dec 1982)			
19	*See* DP-MS-82-52	DE83011271	MN -11	8:34440
CONF-821229-	(Colliquium on physics and chemistry of synthetic and organic metals, Les Arcs, France, 14-18 Dec 1982)			
2	*See* BNL-32651	DE83012076	MN -25	8:34013
CONF-821235-	(International symposium on electrical power engineering, Taipei, Taiwan, 18 Dec 1982)			
1	NTIS, PC A02/MF A01	DE83011426	MN -97c	8:33650
CONF-821237-	(2. biennial conference on refrigeration for cryogenic sensors and electronic systems, Greenbelt, MD, USA, 7-8 Dec 1982)			
1	*See* LA-UR-83-1251	DE83011184	MN -38	8:34220
CONF-821238-	(International conference on systems simulation in buildings, Liege, Belgium, 6-8 Dec 1982)			
1	*See* LBL-14026	DE83011560	MN -59a	8:33893
CONF-830128-	(International conference on photochemistry and photobiology, Alexandria, Egypt, 5-10 Jan 1983)			
3	*See* LBL-15463	DE83012469	MN -4	8:34178
CONF-830130-	(Workshop on atomic physics with fast heavy ion beams, Argonne, IL, USA, 20-21 Jan 1983)			
	NTIS, PC A13/MF A01	DE83011656	MN -34A	8:34707
CONF-830131-	(Transportation Research Board annual meeting, Washington, DC, USA, 17-21 Jan 1983)			
2	NTIS, PC A03/MF A01	DE83011747	MN -96	8:33924
CONF-830134-	(Orbis scientiae conference, Miami, FL, USA, 17-22 Jan 1983)			
4	*See* DOE/ER/40008-33	DE83011584	MN -34D	8:34765
CONF-830138-	(Symposium on nuclear physics, Oaxtepec, Mexico, 4-7 Jan 1983)			
2	*See* LBL-15874	DE83012476	MN -34C	8:34808
CONF-830140-	(18. Rencontre de Moriond conference, La Plagne, France, 23-29 Jan 1983)			
2	*See* BNL-32855	DE83011647	MN -34D	8:34746
CONF-830205-	(Waste management conference, Tucson, AZ, USA, 27 Feb-3 Mar 1983)			
26	*See* DP-MS-82-65	DE83011381	MN -70	8:33204
27	*See* RHO-HS-SA-19-P	DE83010930	MN -70B	8:33244
28	*See* DP-MS-82-81	DE83011608	MN -70	8:33206
29	*See* DP-MS-83-4	DE83011383	MN -70	8:33183
CONF-830224-	(DPF workshop on collider detectors: present capabilities and future possibilities, Berkeley, CA, USA, 28 Feb-4 Mar 1983)			
9	*See* BNL-32843	DE83011361	MN -37	8:34300
10	*See* BNL-32847	DE83011364	MN -37	8:34353
11	*See* BNL-32849	DE83011352	MN -37	8:34301
12	*See* LBL-15866	DE83011673	MN -37	8:34379
13	*See* BNL-32788	DE83011648	MN -37	8:34352
CONF-830228-	(14. southeastern conference on combinatorics, graph theory and computing, Boca Raton, FL, USA, 14-17 Feb 1983)			
1	*See* SAND-83-0099C	DE83010511	MN -32	8:34966
CONF-830229-	(International daylighting conference, Phoenix, AZ, USA, 16-18 Feb 1983)			
1	*See* LBL-14790	DE83011681	MN -95d	8:33894
CONF-830304-	(American Nuclear Society topical conference on computational methods, Salt Lake City, UT, USA, 28-31 Mar 1983)			
21	*See* DP-MS-83-2	DE83011634	MN -32	8:34852
CONF-830307-	(6. American Meteorological Society symposium on turbulence and diffusion, Boston, MA, USA, 22-25 Mar 1983)			
18	*See* DP-MS-82-93	DE83011223	MN -11	8:34397
CONF-830308-	(American Insititute of Chemical Engineers national meeting, Houston, TX, USA, 27-31 Mar 1983)			
12	*See* BNL-32898	DE83011623	MN -38	8:34052

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830311-	(Particle accelerator conference, Santa Fe, NM, USA, 21-23 Mar 1983)			
113	*See* LA-UR-83-775	DE83011109	MN -28	8:34282
114	*See* BNL-32770	DE83011360	MN -28	8:34299
115	*See* BNL-32730	DE83011353	MN -28	8:34281
116	*See* LBL-15234	DE83011702	MN -28	8:34291
117	*See* LBL-15117	DE83011703	MN -28	8:34283
118	*See* LBL-15158	DE83011685	MN -28	8:34289
119	*See* LBL-15208	DE83011668	MN -28	8:34290
120	*See* LBL-15140	DE83011686	MN -28	8:34286
121	*See* LBL-15848	DE83011684	MN -28	8:34320
122	*See* BNL-32658	DE83011653	MN -28	8:34263
123	*See* LBL-15147	DE83011675	MN -28	8:34317
124	*See* LBL-15088	DE83011682	MN -28	8:34314
125	*See* UCRL-88260	DE83012109	MN -28	8:34294
126	*See* LBL-15141	DE83011680	MN -28	8:34287
127	*See* LBL-15136	DE83011678	MN -28	8:34316
128	NTIS, PC A02/MF A01	DE83011712	MN -28	8:34264
129	*See* LBL-15963	DE83012442	MN -28	8:34292
130	NTIS, PC A02/MF A01; 1	DE83011724	MN -28	8:34306
131	NTIS, PC A02/MF A01; 1	DE83011718	MN -28	8:34307
132	NTIS, PC A02/MF A01; 1	DE83011708	MN -28	8:34308
133	*See* LBL-15108	DE83011676	MN -28	8:34315
134	*See* LBL-15157	DE83012470	MN -28	8:34319
135	*See* LBL-15146	DE83012441	MN -28	8:34288
136	*See* LBL-15132	DE83011691	MN -28	8:34284
137	*See* LBL-15137	DE83011692	MN -28	8:34285
138	*See* LBL-15119	DE83011679	MN -28	8:34270
139	*See* LBL-15142	DE83011677	MN -28	8:34271
140	*See* LBL-15148	DE83011687	MN -28	8:34318
CONF-830350-	(8. international technical conference on slurry transport, San Francisco, CA, USA, 15-18 Mar 1983)			
1	*See* DP-MS-82-60	DE83011377	MN -70	8:33187
CONF-830351-	(Workshop on performance and evaluation of local area networks, Worcester, MA, USA, 24-25 Mar 1983)			
1	*See* UCRL-88558	DE83011230	MN -32	8:34969
CONF-830352-	(Conference on elliptic boundary value problems, Monterey, CA, USA, 1 Mar 1983)			
1	*See* LA-UR-83-1201	DE83011149	MN -32	8:34959
CONF-830353-	(Meeting on the impact of specialized processors in elementary particle physics, Padova, Italy, 23-25 Mar 1983)			
1	*See* SLAC-PUB-3073	DE83011514	MN -34D	8:34321
CONF-830354-	(International workshop on atomic physics for ion driven fusion, Paris, France, 21-25 Mar 1983)			
1	*See* SAND-83-0663C	DE83011448	MN -21	8:34939
CONF-830355-	(Meeting of the Societe Royale Belge des Ingenieurs et des Industriels and the Service de Programmation de la Poliytique Scientifique, Brussels, Belgium, 25 Mar 1983)			
1	*See* ECN-83-024		ND -90e	8:33087
CONF-830406-	(5. topical meeting on technology of fusion energy, Knoxville, TN, USA, 26-28 Apr 1983)			
38	NTIS, PC A02/MF A01	DE83012070	MN -20c	8:34912
39	*See* UCRL-88232	DE83012104	MN -20	8:34949
40	NTIS, PC A02/MF A01; 1	DE83012455	MN -20c	8:34913
41	NTIS, PC A02/MF A01; 1	DE83012454	MN -20d	8:34914
42	NTIS, PC A02/MF A01	DE83011725	MN -20d	8:34915
44	NTIS, PC A02/MF A01	DE83011755	MN -20d	8:34916
45	NTIS, PC A02/MF A01; 1	DE83011695	MN -20c	8:34917
46	NTIS, PC A02/MF A01	DE83011729	MN -20d	8:34918
47	NTIS, PC A02/MF A01	DE83011700	MN -20c	8:34919
48	NTIS, PC A02/MF A01	DE83011745	MN -20a	8:34920
49	NTIS, PC A02/MF A01; 1	DE83011751	MN -20d	8:34921
50	NTIS, PC A02/MF A01	DE83011752	MN -20d	8:34922
51	NTIS, PC A02/MF A01; 1	DE83011694	MN -20c	8:34923
52	*See* UCRL-88215	DE83010928	MN -21	8:34948
53	*See* UCRL-88211	DE83010819	MN -20d	8:34947
Abstr.	NTIS, PC A24/MF A01; 1	DE83004943	MN -20	8:34924
CONF-830412-	(5. symposium on meteorological observations and instrumentation, Toronto, Canada, 11-15 Apr 1983)			
2	*See* DP-MS-82-79	DE83012031	MN -11	8:34413
CONF-830418-	(International conference on dimensional stability and mechanical behavior of irradiated metals and alloys, Brighton, UK, 11-14 Apr 1983)			
3	NTIS, PC A02/MF A01	DE83012059	MN -78	8:33735
4	NTIS, PC A02/MF A01	DE83011390	MN -25	8:33957
CONF-830419-	(16. rare earth research conference, Tallahassee, FL, USA, 18-21 Apr 1983)			
5	NTIS, PC A02/MF A01	DE83012098	MN -4	8:34090
6	NTIS, PC A02/MF A01	DE83011404	MN -4	8:33958
7	NTIS, PC A02/MF A01	DE83011402	MN -4	8:34205
CONF-830423-	(5. symposium on safeguards and nuclear material management, Versailles, France, 19-21 Apr 1983)			
9	*See* LA-UR-83-1060	DE83011321	MN -15	8:34054
10	*See* LA-UR-83-1115	DE83011172	MN -15	8:34055

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830426-	(ASTM symposium on chevron-notched specimens testing and stress analysis, Louisville, KY, USA, 21 Apr 1983)			
2	*See* PNL-SA-11289	DE83011577	MN -70	8:33967
CONF-830429-	(Combustion Institute spring technical meeting, Pasadena, CA, USA, 11-12 Apr 1983)			
2	*See* LBL-15799	DE83011674	MN -4	8:34212
CONF-830437-	(ASME international conference on wear of materials, Reston, VA, USA, 11-14 Apr 1983)			
2	NTIS, PC A02/MF A01	DE83012093	MN -25	8:34009
CONF-830439-	(3. multi-phase flow and heat transfer symposium, Miami, FL, USA, 18-20 Apr 1983)			
4	*See* BNL-NUREG-32897	DE83011651	MN -38	8:34230
5	NTIS, PC A02/MF A01	DE83011748	MN -80	8:33738
CONF-830440-	(UCLA symposia on molecular and cellular biology, Keystone, CO, USA, 10-15 Apr 1983)			
2	*See* LA-UR-83-1076	DE83011323	MN -48	8:34494
3	*See* LA-UR-83-1151	DE83011139	MN -48	8:34617
CONF-830443-	(Metallurgical coatings conference, San Diego, CA, USA, 18-22 Apr 1983)			
2	*See* LA-UR-83-1107	DE83011169	MN -25	8:33962
CONF-830445-	(Corrosion '83 conference, Anaheim, CA, USA, 18-22 Apr 1983)			
2	*See* BNL-NUREG-32824	DE83012073	MN -25	8:33955
CONF-830446-	(American Power conference, Chicago, IL, USA, 18-20 Apr 1983)			
3	NTIS, PC A02/MF A01	DE83012069	MN -80	8:33662
4	NTIS, PC A02/MF A01	DE83011723	MN -93	8:33882
CONF-830449-	(DOE contractors workshop, Oak Ridge, TN, USA, 21-23 Apr 1983)			
2	NTIS, PC A02/MF A01	DE83011722	MN -34D	8:34720
CONF-830450-	(IAEA/WHO symposium on biological effects of low level radiation, Venice, Italy, 11-15 Apr 1983)			
2	*See* IAEA-SM-266/24	DE83011711	MN -48	8:34585
CONF-830451-	(American Ceramic Society annual meeting, Chicago, IL, USA, 25-28 Apr 1983)			
2	*See* DP-MS-82-94	DE83011452	MN -70	8:33207
3	*See* DP-MS-82-96	DE83011445	MN -70	8:33208
4	NTIS, PC A02/MF A01	DE83011398	MN -70	8:33196
5	*See* PNL-SA-10934	DE83011950	MN -70	8:33232
CONF-830455-	(Yamada conference on muon spin rotation and associated problems, Shimoda, Japan, 18-27 Apr 1983)			
1	*See* LA-UR-83-995	DE83011312	MN -34A	8:34864
5	*See* LA-UR-83-1027	DE83011330	MN -34A	8:34865
CONF-830456-	(Symposium on quantum fluids and solids, Sanibel Island, FL, USA, 11-15 Apr 1983)			
3	*See* LBL-15646	DE83011566	MN -4	8:34739
CONF-830457-	(IEEE conference on reliability physics, Phoenix, AZ, USA, 5-7 Apr 1983)			
1	*See* SAND-83-0378C	DE83011280	MN -34	8:34248
CONF-830459-	(7. smoke/obscurants symposium, Adelphi, MD, USA, 26-28 Apr 1983)			
1	NTIS, PC A02/MF A01	DE83011388	MN -41	8:34396
CONF-830460-	(Annual meeting of the National Council of Radiation Protection and Measurements, Washington, DC, USA, 6-7 Apr 1983)			
1	NTIS, PC A02/MF A01; 1	DE83012038	MN -11	8:34424
2	NTIS, PC A02/MF A01	DE83011731	MN -11	8:34412
CONF-830461-	(SHARE European Association spring meeting, Noordwijkerhout, Netherlands, 25-29 Apr 1983)			
1	*See* LA-UR-83-1226	DE83011180	MN -32	8:34960
CONF-830462-	(Seminar on the dynamics of the transfer to man of radioactive materials deposited subsequent to an accidental release to atmosphere, Dublin, Ireland, 11-15 Apr 1983)			
1	NTIS, PC A02/MF A01; 1	DE83011396	MN -11	8:33739
CONF-830463-	(American Physical Society spring meeting, Balitmore, MD, USA, 18-21 Apr 1983)			
1	*See* LA-UR-83-1087	DE83011167	MN -21	8:34929
CONF-830464-	(14. annual modeling and simulation conference, Pittsburgh, PA, USA, 21-22 Apr 1983)			
1	NTIS, PC A02/MF A01; 1	DE83012065	MN -97d	8:33651
CONF-830465-	(IAEA meeting on basic and applied problems of nuclear level densities, Upton, NY, USA, 11-15 Apr 1983)			
1	NTIS, PC A02/MF A01	DE83012063	MN -34C	8:34846
2	*See* UCRL-89024	DE83012103	MN -34C	8:34824
CONF-830466-	(DOE workshop on copper alloys, Washington, DC, USA, 14-15 Apr 1983)			
1	*See* LA-UR-83-1152	DE83011140	MN -20c	8:34930
CONF-830467-	(Multivariable regression symposium, Nashville, TN, USA, 27-28 Apr 1983)			
1	*See* DP-MS-83-18	DE83012006	MN -70	8:33209
CONF-830469-	(Nuclear physics with heavy ions conference, Stony Brook, NY, USA, 14-16 Apr 1983)			
1	NTIS, PC A02/MF A01	DE83011710	MN -34C	8:34819
2	NTIS, PC A02/MF A01; 1	DE83011721	MN -34A	8:34806
3	NTIS, PC A02/MF A01	DE83011717	MN -34C	8:34835

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830470-	(4. international meeting on tryptophan metabolism, Munich, F.R. Germany, 19-22 Apr 1983)			
1	*See* BNL-32891	DE83011624	MN -48	8:34511
CONF-830471-	(Saturne study meeting, Maine-et-Loire, France, 25-29 Apr 1983)			
1	*See* BNL-32904	DE83011642	MN -28	8:34302
CONF-830472-	(Chapman conference on magnetospheric currents, Irvington, VA, USA, 5-8 Apr 1983)			
1	*See* LA-UR-83-1014	DE83011333	MN -34B	8:34696
CONF-830503-	(2. European symposium on flywheel energy storage, Torino, Italy, 9-14 May 1983)			
2	*See* UCRL-89085	DE83012048	MN -94b	8:33779
CONF-830508-	(163. Electrochemical Society meeting, San Francisco, CA, USA, 8-13 May 1983)			
15	*See* UCRL-88485	DE83012046	MN -4	8:33970
16	*See* UCRL-88486	DE83012047	MN -4	8:33971
17	*See* SAND-82-2795C	DE83011860	MN -34	8:34384
CONF-830512-	(IEE/APS symposium, Houston, TX, USA, 23 May-1 Jun 1983)			
2	*See* UCRL-88555	DE83012097	MN -38	8:34250
CONF-830517-	(33. electronic components conference, Orlando, FL, USA, 16-18 May 1983)			
5	*See* BDX-613-2872	DE83011552	MN -38	8:34241
CONF-830518-	(29. international symposium of the Instrument Society of America, Albuquerque, NM, USA, 2-6 May 1983)			
3	NTIS, PC A02/MF A01	DE83011591	MN -79m	8:33688
CONF-830519-	(Symposium on the interaction of non-nuclear munitions with structures, Colorado Springs, CO, USA, 10-13 May 1983)			
1	*See* SAND-82-2470C	DE83007276	MN -25	8:34044
2	*See* SAND-83-0352C	DE83007295	MN -35	8:34225
CONF-830520-	(2. international congress on building energy management, Ames, IA, USA, 31 May-3 Jun 1983)			
3	*See* LA-UR-83-990	DE83011311	MN -59c	8:33406
4	*See* LBL-15907	DE83012443	MN -95d	8:33895
CONF-830523-	(International conference on radioactive waste management, Seattle, WA, USA, 16-20 May 1983)			
6	*See* DP-MS-82-61	DE83011609	MN -70B	8:33203
CONF-830528-	(7. international symposium on packaging and transportation of radioactive materials, New Orleans, LA, USA, 15-20 May 1983)			
2	*See* SAND-83-0002C	DE83011496	MN -71	8:34223
3	*See* SAND-83-0003C	DE83011498	MN -71	8:34224
4	*See* SAND-83-0004C	DE83011497	MN -15	8:33256
6	*See* DOE/NV/10282-1013	DE83011261	MN -71	8:33186
CONF-830531-	(International conference on tools, methods, and languages for scientific and engineering computation, Paris, France, 17-19 May 1983)			
2	*See* LA-UR-83-1275	DE83011294	MN -32	8:34961
CONF-830538-	(6. international conference on radiation shielding, Tokyo, Japan, 16-20 May 1983)			
4	*See* LA-UR-83-1197	DE83011148	MN -38	8:34854
CONF-830542-	(12. lignite conference, Grand Forks, ND, USA, 18-19 May 1983)			
1	*See* DOE/FE/60181-3	DE83011488	MN -90b	8:33079
2	*See* DOE/FE/60181-4	DE83011484	MN -90	8:32941
3	*See* DOE/FE/60181-2	DE83011444	MN -90a	8:33015
CONF-830543-	(IEEE international symposium on circuits and systems, Los Angeles, CA, USA, 2 May 1983)			
1	NTIS, PC A02/MF A01; 1	DE83011293	MN -97c	8:33652
2	NTIS, PC A02/MF A01	DE83011428	MN -97c	8:33653
CONF-830544-	(7. heat treating conference, Chicago, IL, USA, 10-12 May 1983)			
1	*See* SAND-82-2498C	DE83011299	MN -25	8:33968
CONF-830545-	(Core systems working group information meeting, Richland, WA, USA, 10-12 May 1983)			
1	*See* LA-UR-83-1248	DE83011183	MN -79b	8:33689
CONF-830546-	(38. annual Purdue industrial waste conference, West Lafayette, IN, USA, 10-12 May 1983)			
1	*See* BDX-613-2938	DE83011123	MN -41	8:34253
CONF-830547-	(7. annual symposium of the Mexican American Engineering Society, Ventura, CA, USA, 3-5 May 1983)			
1	*See* LA-UR-83-1238	DE83011182	MN -78	8:33749
CONF-830548-	(5. biennial university-government-industry microelectronics symposium, Lubbock, TX, USA, 25-27 May 1983)			
1	*See* UCRL-89100	DE83010585	MN -38	8:34251
CONF-830549-	(7. annual EPRI contractors' conference on coal liquefaction, Palo Alto, CA, USA, 11-13 May 1983)			
1	NTIS, PC A02/MF A01	DE83011351	MN -90c	8:32945
CONF-830550-	(American Gas Association operating section transmission conference, Seattle, WA, USA, 2-4 May 1983)			
1	NTIS, PC A02/MF A01	DE83011727	MN -11	8:33164
CONF-830605-	(24. symposium on rock mechanics, College Station, TX, USA, 20 Jun 1983)			
6	*See* SAND-83-0917C	DE83009697	MN -70	8:34673

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830606-	(3. international conference on magagauss magnetic field generation and related topics, Novosibirsk, USSR, 13-17 Jun 1983)			
6	*See* LA-UR-83-999	DE83011110	MN -38	8:34928
7	*See* UCRL-88704	DE83012111	MN -34D	8:34950
CONF-830607-	(American Society of Mechanical Engineers pressure vessel and piping conference, Portland, OR, USA, 19-24 Jun 1983)			
1	*See* LA-UR-83-148	DE83006056	MN -32	8:33726
2	*See* LA-UR-83-147	DE83006055	MN -32	8:34213
3	NTIS, PC A03/MF A01; 1	DE83008523	MN -80	8:33724
4	NTIS, PC A03/MF A01	DE83009682	MN -79	8:33740
5	NTIS, PC A03/MF A01; 1	DE83010754	MN -79p	8:33741
7	*See* GA-A-16918	DE83010187	MN -77	8:33682
8	*See* UCRL-86230	DE83002056	MN -2	8:33770
9	*See* LA-UR-83-658	DE83010162	MN -38	8:33748
10	*See* UCRL-89005	DE83009122	MN -38	8:34215
CONF-830609-	(ANS annual meeting, Detroit, MI, USA, 12-17 Jun 1983)			
12	*See* DP-MS-82-109	DE83011224	MN -80	8:33736
CONF-830614-	(7. DOE solar energy research conference, San Francisco, CA, USA, 1 Jun 1983)			
1	*See* BNL-32680	DE83008591	MN -4	8:34177
CONF-830617-	(76. annual meeting of the Air Pollution Control Association, Atlanta, GA, USA, 19-24 Jun 1983)			
5	NTIS, PC A02/MF A01	DE83011726	MN -90i	8:33019
CONF-830622-	(American Solar Energy Society meeting, Minneapolis, MN, USA, 1-3 Jun 1983)			
3	*See* SERI/TP-254-1935	DE83010688	MN -59c	8:33410
4	NTIS, PC A02/MF A01	DE83010758	MN -59	8:33538
6	*See* SERI/TP-234-1816	DE83009104	STD -62	8:33354
CONF-830628-	(American control conference, San Francisco, CA, USA, 22-24 Jun 1983)			
1	NTIS, PC A02/MF A01	DE83011292	MN -97c	8:33654
2	NTIS, PC A02/MF A01	DE83011425	MN -97c	8:33655
3	NTIS, PC A04/MF A01	DE83011427	MN -97c	8:33656
4	NTIS, PC A02/MF A01; 1	DE83011289	MN -97c	8:33657
CONF-830629-	(18. AIAA thermophysics conference, Montreal, Canada, 1-3 Jun 1983)			
1	*See* LA-UR-83-1168	DE83011143	MN -80	8:33692
2	*See* LA-UR-83-1080	DE83011324	MN -38	8:34231
CONF-830630-	(International conference on passive and low energy architecture, Chania, Crete, Greece, 27 Jun-3 Jul 1983)			
1	*See* LA-UR-83-1114	DE83011171	MN -59c	8:33407
CONF-830631-	(6. biennial wind energy conference, Minneapolis, MN, USA, 1-3 Jun 1983)			
1	*See* SAND-82-2552C	DE83011501	MN -60	8:33614
2	*See* SAND-82-2543C	DE83012226	MN -60	8:33613
CONF-830632-	(3. international conference on emerging nuclear energy systems, Helsinki, Finland, 6-9 Jun 1983)			
1	*See* LA-UR-83-1175	DE83011147	MN -21	8:34931
CONF-830633-	(3. symposium on separation science and technology for energy applications, Gatlinburg, TN, USA, 27 Jun-1 Jul 1983)			
1-Summ.	*See* DP-MS-82-73	DE83011446	MN -70	8:33205
CONF-830635-	(19. AIAA-SAE-ASME joint propulsion conference, Seattle, WA, USA, 27-29 Jun 1983)			
1	*See* DOE/NASA/51040-46	DE83011470	STD -96	8:33948
COO-				
2218-269	*See* DOE/ET/52040-T8	DE83012318	MN -20a	8:34925
4142-11	NTIS, PC A02/MF A01	DE83011862	MN -59a	8:33404
CTH-JVG-				
5	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750499	MN -66b	8:33568
DFE-				
42	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750476	MN -95	8:33805
46	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750544	MN -95d	8:33892
47	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750459	MN -95	8:33822
48	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750464	MN -61a	8:33952
49	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750475	MN -13	8:33806
50	NTIS (US Sales Only), PC A14/MF A01; 1	DE83750521	MN -95a	8:33807
DFVLR-FB-				
82-04	*See* N-8230368			8:34232
82-25	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750855	MN -60	8:34217
DFVLR-MITT-				
82-09	NTIS (US Sales Only), PC A15/MF A01; 1	DE83750378	MN -11	8:34394
DOE/BETC-				
83/1	NTIS, PC A06/MF A01	DE83011813	STD -92a	8:33127
DOE/BETC/IC-				
83/1	NTIS, PC A11/MF A01	DE83011924	STD -92a	8:33128
DOE/BETC/QPR-				
82/4	NTIS, PC A04/MF A01	DE83012565	STD -92a	8:33129
DOE/BETC/SP-				
83/14	NTIS, PC A04/MF A01; 1	DE83012187	STD -92a	8:33130
83/15	NTIS, PC A20/MF A01; 1	DE83011918	STD -92a	8:33131
83/16	NTIS, PC A07/MF A01; 1	DE83011933	STD -92a	8:33132
83/17	NTIS, PC A02/MF A01; 1	DE83012188	STD -92a	8:33133

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/CH/00016-1402	NTIS, PC A05/MF A01; 1	DE83011264	STD -90c	8:32946
DOE/CH/10104-1	NTIS, PC A05/MF A01; 1	DE83011191	MN -95d	8:33321
DOE/CONF-810622-Exc.-Vol.2	*See* CONF-810622-Vol.2	DE83003789	ND -64	8:33366
DOE/CS/24448-T2	NTIS, PC A04/MF A01	DE83012276	MN -96	8:33925
DOE/CS/54277-T1	NTIS, PC A09/MF A01; 1	DE83011582	MN -96	8:33933
DOE/EI/06397-T1	NTIS, PC A07/MF A01; 1	DE83012521	MN -98A	8:33852
DOE/EI/11550-T1	NTIS, PC A02/MF A01; 1	DE83011850	MN -98B	8:33853
DOE/EI/19620-T1	NTIS, PC A02/MF A01; 1	DE83012197	MN -98B	8:33854
DOE/EIA-0130(83/ 04)	NTIS, PC A06/MF A01; 1	DE83011655	MN -98C	8:33161
0366	NTIS, PC A08/MF A01; 1	DE83011891	MN -98C	8:33162
0383(82)	NTIS, PC A12/MF A01	DE83011947	MN -98	8:33146
0391	NTIS, PC A05/MF A01	DE83011479	MN -98	8:33855
0394-Vol.1	NTIS, PC A03/MF A01	DE83012435	MN -98A	8:33856
0394-Vol.2	NTIS, PC A08/MF A01	DE83011478	MN -98A	8:33857
0394-Vol.3	NTIS, PC A05/MF A01	DE83012446	MN -98A	8:33858
DOE/ER-0127/ 1	NTIS, PC A04/MF A01; 1	DE83011812	STD -02	8:34952
0164	NTIS, PC A05/MF A01; 1	DE83011840	MN -28	8:34312
DOE/ER/10416-T2	NTIS, PC A02/MF A01; 1	DE83012445	MN -34C	8:34863
DOE/ER/40008-33	NTIS, PC A02/MF A01	DE83011584	MN -34D	8:34765
DOE/ER/40048-23P2	NTIS, PC A02/MF A01	DE83011615	MN -34B	8:34680
25-P2	NTIS, PC A02/MF A01; 1	DE83011618	MN -34D	8:34756
26-P2	NTIS, PC A03/MF A01; 1	DE83011617	MN -34D	8:34757
32-L2	NTIS, PC A05/MF A01; 1	DE83011480	MN -34C	8:34799
33-L2	NTIS, PC A02/MF A01	DE83011483	MN -34	8:34822
38-L2	NTIS, PC A04/MF A01	DE83011485	MN -34C	8:34834
DOE/ER/70224-T6	NTIS, PC A13; 3	DE83005018	ND -66a	8:33569
DOE/ET/00260-T1	NTIS, PC A03/MF A01; 1	DE83011690	MN -90d	8:33265
DOE/ET/10023-4-Vol.1	NTIS, PC A12/MF A01; 1	DE83011344	STD -88	8:33072
4-Vol.2	NTIS, PC A02/MF A01	DE83011345	STD -88	8:33073
4-Vol.3	NTIS, PC A03/MF A01	DE83011346	STD -88	8:33074
4-Vol.4	NTIS, PC A05/MF A01	DE83011347	STD -88	8:33075
DOE/ET/10136-T2	NTIS, PC A04/MF A01; 1	DE83011707	MN -92	8:33102
DOE/ET/10532-T11	NTIS, PC A04/MF A01	DE83007200	STD -90d	8:32947
DOE/ET/12138-1341-Vol.1	NTIS, PC A06/MF A01; 1	DE83008494	STD -92a	8:33166
1341-Vol.2	NTIS, PC A10/MF A01	DE83008483	STD -92a	8:33167
DOE/ET/12385-1	NTIS, PC A06/MF A01	DE83012473	STD -92b	8:33138
DOE/ET/13153-T9	NTIS, PC A04/MF A01; 1	DE83011000	MN -90d	8:32948
DOE/ET/15350-2	NTIS, PC A12/MF A01	DE83012209	MN -95f	8:33934
DOE/ET/21105-T1	NTIS, PC A07/MF A01; 1	DE83007078	MN -62d	8:33539
DOE/ET/29147-6	NTIS, PC A08/MF A01	DE83012233	MN -64	8:33402
DOE/ET/29297-2	NTIS MF A01; 2	DE83012613	STD -97a	8:33658
DOE/ET/52040-T8	NTIS, PC A02/MF A01; 1	DE83012318	MN -20a	8:34925
DOE/ET/53088-90	NTIS, PC A02/MF A01	DE83011490	MN -20f	8:34894
DOE/EV/03286-22	NTIS, PC A02/MF A01; 1	DE83012227	MN -48	8:34574
DOE/EV/10302-1	NTIS, PC A07/MF A01; 1	DE83011500	STD -11	8:33165
DOE/FE/15079-T2	NTIS, PC A02/MF A01; 1	DE83012403	MN -90i	8:33020
DOE/FE/55014-T2	NTIS, PC A09/MF A01; 1	DE83011547	MN -89	8:32949
DOE/FE/60181-2	NTIS, PC A02/MF A01	DE83011444	MN -90a	8:33015
3	NTIS, PC A02/MF A01	DE83011488	MN -90b	8:33079
4	NTIS, PC A03/MF A01	DE83011484	MN -90	8:32941
DOE/ID/01570-T59	NTIS, PC A10/MF A01	DE83011953	MN -70B	8:33197

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/ID/12223-				
T2	NTIS, PC A02/MF A01; 1	DE83009754	MN -70	8:33198
T3	NTIS, PC A02/MF A01; 1	DE83009756	MN -70	8:33199
DOE/ID/12259-				
T1	NTIS, PC A07/MF A01; 1	DE83012492	MN -66a	8:33556
DOE/IG-				
0008/ 4	DOE Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830		ND -13	8:33785
0160	TIC	DE83008187	ND -11	8:33786
0190	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		STD -13	8:33787
DOE/LC/10916-				
T1	NTIS, PC A04/MF A01; 1	DE83011736	STD -91	8:33168
DOE/MA-				
0106	NTIS, PC A03/MF A01	DE83011808	MN -13	8:33795
DOE/MC/08060-				
T1	NTIS, PC A04/MF A01	DE83012407	MN -92a	8:33158
DOE/MC/14731-				
T1	NTIS, PC A02/MF A01	DE83006600	MN -90i	8:32950
T2	NTIS, PC A02/MF A01	DE83006646	MN -90i	8:32951
DOE/MC/16000-				
1294-Vol.4	NTIS, PC A11/MF A01; 1	DE83001908	STD -90e	8:33086
DOE/MC/16505-				
T1	NTIS, PC A02/MF A01	DE83012244	MN -90	8:34956
DOE/MC/19403-				
1	NTIS, PC A03/MF A01	DE83011892	MN -90c	8:32952
DOE/METC/SP-				
195	NTIS, PC A03/MF A01	DE83011811	STD -90c	8:32953
DOE/NASA/0059-				
1	NTIS, PC A11/MF A01; 1	DE83011771	STD -96	8:33951
DOE/NASA/51040-				
46	NTIS, PC A02/MF A01	DE83011470	STD -96	8:33948
DOE/NBB-				
0032-Vol.1	NTIS, PC A17/MF A01; 1	DE83011411	MN -98E	8:33862
0032-Vol.2	NTIS, PC A06; 3	DE83011409	ND -98E	8:33863
0033	NTIS, PC A02/MF A01	DE83011929	MN -97	8:33659
DOE/NBM-				
3011540	NTIS, PC A20/MF A01	DE83011540	MN -13	8:32954
3011541	NTIS, PC A12/MF A01	DE83011541	MN -13	8:32955
3011701	NTIS, PC A04/MF A01	DE83011701	MN -61a	8:33266
3012133	NTIS, PC A02/MF A01	DE83012122	MN -66	8:33550
3012245	NTIS, PC A03/MF A01	DE83012245	MN -2	8:34953
3012249	NTIS, PC A03; 3	DE83012249	ND -92	8:33157
3012254	NTIS, PC A02/MF A01	DE83012254	MN -66	8:33564
3012255	NTIS, PC A02/MF A01	DE83012255	MN -66g	8:33566
3012256	NTIS, PC A03/MF A01	DE83012256	MN -20	8:34893
3012263	NTIS, PC A06/MF A01; 1	DE83012263	MN -61a	8:33322
3012266	NTIS, PC A02/MF A01	DE83012266	MN -89	8:32956
3012267	NTIS, PC A02/MF A01; 1	DE83012267	MN -66g	8:33551
3012268	NTIS, PC A04/MF A01	DE83012268	MN -13	8:33808
DOE/NE/34096-				
1	NTIS, PC A04/MF A01; 1	DE83011761	MN -78	8:33742
DOE/NOAA/OTEC-				
24(Vol.1)	NTIS, PC A11/MF A01	DE83011600	STD -64	8:33403
DOE/NV/10282-				
1013	NTIS, PC A02/MF A01	DE83011261	MN -71	8:33186
T2	NTIS, PC A03/MF A01	DE83011890	MN -37	8:34386
DOE/OR/20837-				
1	NTIS, PC A07/MF A01	DE83012385	MN -13	8:33826
T1	NTIS, PC A04/MF A01; 1	DE83011539	MN -98E	8:33618
DOE/PC/50804-				
2	NTIS, PC A03/MF A01	DE83011889	MN -90a	8:33267
DOE/PC/51252-				
T2	NTIS, PC A04/MF A01	DE83011909	MN -90d	8:32957
DOE/PE-				
0046	NTIS, PC A04/MF A01; 1	DE83011938	STD -92	8:33163
DOE/PE/70009-				
T1	NTIS, PC A06/MF A01; 1	DE83011529	MN -98E	8:33619
T2	NTIS, PC A06/MF A01	DE83011537	MN -98F	8:33864
T4	NTIS, PC A03/MF A01	DE83011532	MN -98E	8:33620
DOE/PE/70019-				
T1	NTIS, PC A04/MF A01; 1	DE83012189	MN -11	8:33021
DOE/PE/70041-				
T1	NTIS, PC A05/MF A01	DE83011528	MN -98G	8:33147
T2	NTIS, PC A04/MF A01	DE83011510	MN -98F	8:33865
DOE/PE/70225-				
1	NTIS, PC A07/MF A01	DE83012366	MN -98E	8:33621
DOE/PE/70274-				
T1	NTIS, PC A04/MF A01; 1	DE83011542	MN -98E	8:33622
T2	NTIS, PC A08/MF A01; 1	DE83011536	MN -98E	8:33623
T3	NTIS, PC A06/MF A01; 1	DE83011543	MN -98E	8:33624
DOE/PE/70431-				
T1	NTIS, PC A03/MF A01	DE83011511	MN -98F	8:33844
DOE/PE/70472-				
T1	NTIS, PC A03/MF A01; 1	DE83011531	MN -98F	8:33866

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/R4/10371-T1	NTIS, PC A05/MF A01; 1	DE83009820	MN -90c	8:33159
DOE/RG/10295-T1	NTIS, PC A04/MF A01	DE83011538	MN -98F	8:33867
DOE/RL/10378-82/ 1	NTIS, PC A06/MF A01	DE83011844	MN -60	8:33592
DOE/SF/11563-T1	NTIS, PC A06/MF A01; 1	DE83011632	MN -66a	8:33577
DOE/SR-WM-79-3-Rev.2/ 83	NTIS, PC A03/MF A01	DE83010816	STD -70	8:33200
DOE/TIC-3311-S12	NTIS	DE83007280	STD -70	8:33201
DP-MS-82-46	NTIS, PC A02/MF A01	DE83011378	MN -70	8:33202
82-52	NTIS, PC A02/MF A01	DE83011271	MN -11	8:34440
82-53	NTIS, PC A02/MF A01	DE83012087	MN -25	8:33959
82-54	NTIS, PC A02/MF A01	DE83010592	MN -25	8:34015
82-60	NTIS, PC A03/MF A01; 1	DE83011377	MN -70	8:33187
82-61	NTIS, PC A02/MF A01	DE83011609	MN -70B	8:33203
82-65	NTIS, PC A02/MF A01; 1	DE83011381	MN -70	8:33204
82-73	NTIS, PC A02/MF A01	DE83011446	MN -70	8:33205
82-79	NTIS, PC A02/MF A01; 1	DE83012051	MN -11	8:34413
82-81	NTIS, PC A03/MF A01	DE83011608	MN -70	8:33206
82-86	NTIS, PC A02/MF A01	DE83012126	MN -11	8:34414
82-93	NTIS, PC A02/MF A01	DE83011223	MN -11	8:34397
82-94	NTIS, PC A02/MF A01	DE83011452	MN -70	8:33207
82-96	NTIS, PC A03/MF A01; 1	DE83011445	MN -70	8:33208
82-101	NTIS, PC A02/MF A01	DE83011244	MN -32	8:34957
82-109	NTIS, PC A02/MF A01	DE83011224	MN -80	8:33736
83-2	NTIS, PC A02/MF A01	DE83011634	MN -32	8:34852
83-4	NTIS, PC A02/MF A01	DE83011383	MN -70	8:33183
83-18	NTIS, PC A03/MF A01; 1	DE83012006	MN -70	8:33209
DPSP-79-17-12	NTIS, PC A02/MF A01; 1	DE83012200	MN -70	8:33210
79-17-17	NTIS, PC A02/MF A01; 1	DE83012202	MN -70	8:33211
82-30-14	NTIS, PC A02/MF A01	DE83011243	MN -78	8:33737
DPST-70-512	NTIS, PC A02/MF A01	DE83012201	MN -70	8:33212
78-150-2	NTIS, PC A03/MF A01; 1	DE83011266	MN -70	8:34043
81-914	NTIS, PC A04/MF A01; 1	DE83012206	MN -70	8:33213
DPSTD-82-65-Rev.1	NTIS, PC A03/MF A01; 1	DE83012204	MN -70	8:33214
E-1270	*See* N-8231443			8:33330
ECN-83-024	ECN, P.O. Box 1, 1755 ZG Petten, Netherlands		ND -90e	8:33087
EPA-520/ 5-82-0111	*See* PB-83-159798			8:34417
EPRI-CS-2897-Vol.1	NTIS, PC A19/MF A01; 1	DE83901965	MN -90i	8:33022
EPRI-EL-2943-CCM	NTIS, PC A08/MF A01	DE83901922	MN -97a	8:33660
EPRI-NP-2374	*See* NUREG/CR-2568	DE83902161	MN -78	8:33756
2966	NTIS, PC A06/MF A01; 1	DE83901978	MN -78	8:33743
ESA-CR(P)-1589	*See* N-8231499			8:33926
EUR-7802-FR	European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037		ND -66	8:33567
8159-FR	European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037		ND -63	8:33323
8204-FR	European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037		ND -63	8:33361
8210-FR	European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 20037		ND -63	8:33324
8213-EN/ FR	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -63	8:33325
8291-EN	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -98F	8:33791
8305-FR	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -63	8:33326
8328-EN	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -63	8:33362
FCR-3278	NTIS, PC A11/MF A01; 1	DE83011436	MN -97d	8:33883
FE-2315-84	*See* DOE/ET/10532-T11	DE83007200	STD -90d	8:32947
FERMILAB-Pub-83/ 25-THY	NTIS, PC A05/MF A01; 1	DE83011059	MN -34D	8:34758
FFA-AU-1440	*See* NE-VIND-82-16	DE83750539	MN -60	8:33604
FFA-HU-2115	*See* NE-VIND-82-18	DE83750508	MN -60	8:33605
2229	*See* NE-VIND-82-20	DE83750511	MN -60	8:33607

Report No.	Availability	Order No.	Distribution Category	Abstract No.
FFA-TN-				
1982-01	*See* NE-VIND-82-26	DE83750513	MN -60	8:33591
GA-A-				
16890	NTIS, PC A02/MF A01	DE83011883	MN -20d	8:34926
16918	NTIS, PC A02/MF A01	DE83010187	MN -77	8:33682
GEAP-				
22046	*See* NUREG/CR-2568	DE83902161	MN -78	8:33756
GEND-INF-				
019-Vol.2	NTIS, PC A04/MF A01	DE83011877	MN -78	8:33744
GEPP-TIS-				
702	NTIS, PC A02/MF A01	DE83011916	MN -13	8:33262
GJBX-				
12(83)	NTIS PC E04/MF A01; 1	DE83011303	MN -51	8:33176
GKSS-				
82/ E/ 10	NTIS (US Sales Only), PC A03/MF A01	DE83750055	MN -38	8:34260
GSF-BPT-				
5/ 82	Gesellschaft fuer Strahlen- und Umweltforschung, Muenchen, Germany		MN -93	8:34575
GSF-R-				
268	NTIS (US Sales Only), PC A11/MF A01	DE83750104	MN -11	8:34441
IAEA-SM-				
266/ 24	NTIS, PC A03/MF A01	DE83011711	MN -48	8:34585
IC-				
80/ 147	NTIS (US Sales Only), PC A02/MF A01	DE83701174	MN -34D	8:34868
80/ 158	NTIS (US Sales Only), PC A04/MF A01	DE83701175	MN -34D	8:34768
80/ 181	NTIS (US Sales Only), PC A04/MF A01	DE83701176	MN -34D	8:34769
80/ 192	NTIS (US Sales Only), PC A02/MF A01	DE83701177	MN -34D	8:34888
81/ 5	NTIS (US Sales Only), PC A02/MF A01	DE83701189	MN -34D	8:34869
81/ 7	NTIS (US Sales Only), PC A02/MF A01	DE83701190	MN -34D	8:34870
81/ 14	NTIS (US Sales Only), PC A03/MF A01	DE83701183	MN -34D	8:34871
81/ 22	NTIS (US Sales Only), PC A02/MF A01	DE83701184	MN -34D	8:34872
81/ 25	NTIS (US Sales Only), PC A02/MF A01	DE83701185	MN -34D	8:34889
81/ 26	NTIS (US Sales Only), PC A02/MF A01	DE83701186	MN -34D	8:34873
81/ 32	NTIS (US Sales Only), PC A02/MF A01	DE83701187	MN -34D	8:34874
81/ 40	NTIS (US Sales Only), PC A02/MF A01	DE83701188	MN -34D	8:34770
81/ 75	NTIS (US Sales Only), PC A03/MF A01	DE83701191	MN -34D	8:34875
81/ 79	NTIS (US Sales Only), PC A02/MF A01	DE83701192	MN -34D	8:34876
81/ 81	NTIS (US Sales Only), PC A02/MF A01	DE83701193	MN -34D	8:34771
81/ 93	NTIS (US Sales Only), PC A02/MF A01	DE83701194	MN -34D	8:34772
81/ 95	NTIS (US Sales Only), PC A03/MF A01	DE83701195	MN -34D	8:34890
81/ 105	NTIS (US Sales Only), PC A03/MF A01	DE83701178	MN -34D	8:34773
81/ 115	NTIS (US Sales Only), PC A02/MF A01	DE83701179	MN -34D	8:34891
81/ 120	NTIS (US Sales Only), PC A02/MF A01	DE83701180	MN -34D	8:34759
81/ 123	NTIS (US Sales Only), PC A02/MF A01	DE83701181	MN -34D	8:34774
81/ 138	NTIS (US Sales Only), PC A02/MF A01	DE83701182	MN -34D	8:34775
82/ 60	NTIS (US Sales Only), PC A02/MF A01	DE83701196	MN -34D	8:34776
82/ 64	NTIS (US Sales Only), PC A02/MF A01	DE83701197	MN -34D	8:34777
IFU-B-				
22-82	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750899	MN -59a	8:33405
IIUG-				
81-10	NTIS (US Sales Only), PC A04/MF A01	DE83750061	MN -11	8:33801
IKE-K-				
69	NTIS (US Sales Only), PC A05/MF A01	DE83750095	MN -2	8:33813
INIS-mf-				
7133	NTIS (US Sales Only), PC A02/MF A01	DE83780455	MN -48	8:34513
7355	NTIS (US Sales Only), PC A03/MF A01	DE83780405	MN -77	8:33706
7399	NTIS (US Sales Only), PC A06/MF A01	DE83780481	MN -70	8:34462
7412	NTIS (US Sales Only), PC A05/MF A01	DE83780465	MN -48	8:34514
7413	NTIS (US Sales Only), PC A03/MF A01	DE83780450	MN -48	8:34515
7414	NTIS (US Sales Only), PC A03/MF A01	DE83780466	MN -48	8:34516
7416	NTIS (US Sales Only), PC A07/MF A01	DE83780482	MN -70	8:34463
7417	NTIS (US Sales Only), PC A08/MF A01	DE83780468	MN -38	8:34517
7420	NTIS (US Sales Only), PC A04/MF A01	DE83780456	MN -48	8:34518
7421	NTIS (US Sales Only), PC A06/MF A01	DE83780475	MN -37	8:34519
7422	NTIS (US Sales Only), PC A05/MF A01	DE83780476	MN -37	8:34520
7425	NTIS (US Sales Only), PC A06/MF A01	DE83780451	MN -48	8:34521
7426	NTIS (US Sales Only), PC A04/MF A01	DE83780457	MN -48	8:34522
7427	NTIS (US Sales Only), PC A05/MF A01	DE83780458	MN -48	8:34523
7428	NTIS (US Sales Only), PC A05/MF A01	DE83780459	MN -48	8:34524
7429	NTIS (US Sales Only), PC A07/MF A01	DE83780460	MN -48	8:34525
7430	NTIS (US Sales Only), PC A04/MF A01	DE83780461	MN -48	8:34526
7435	NTIS (US Sales Only), PC A06/MF A01	DE83780462	MN -48	8:34527
7439	NTIS (US Sales Only), PC A05/MF A01	DE83780452	MN -48	8:34528
7440	NTIS (US Sales Only), PC A02/MF A01	DE83780472	MN -77	8:34464
7442	NTIS (US Sales Only), PC A12/MF A01	DE83780469	MN -80	8:34465
7443	NTIS (US Sales Only), PC A02/MF A01	DE83780471	MN -78	8:34466
7445	NTIS (US Sales Only), PC A02/MF A01	DE83780470	MN -85	8:34467
7447	NTIS (US Sales Only), PC A08/MF A01	DE83780467	MN -48	8:34529
7448	NTIS (US Sales Only), PC A09/MF A01	DE83780463	MN -48	8:34530
7450	NTIS (US Sales Only), PC A03/MF A01	DE83780464	MN -48	8:34531
7451	NTIS (US Sales Only), PC A04/MF A01	DE83780453	MN -48	8:34532
7455	NTIS (US Sales Only), PC A04/MF A01	DE83780477	MN -37	8:34533
7458	NTIS (US Sales Only), PC A05/MF A01	DE83780478	MN -11	8:34468
7459	NTIS (US Sales Only), PC A06/MF A01	DE83780479	MN -37	8:34534
7462	NTIS (US Sales Only), PC A07/MF A01	DE83780473	MN -77	8:34469

Report No.	Availability	Order No.	Distribution Category	Abstract No.
7467	NTIS (US Sales Only), PC A02/MF A01	DE83780483	MN -15	8:34470
7468	NTIS (US Sales Only), PC A05/MF A01	DE83780474	MN -79	8:34471
7469	NTIS (US Sales Only), PC A13/MF A01	DE83780480	MN -70	8:34472
7473	NTIS (US Sales Only), PC A04/MF A01	DE83780454	MN -48	8:34535
7475-Vol.A	NTIS (US Sales Only), PC A19/MF A01	DE83780432	MN -2	8:34951
7481	NTIS (US Sales Only), PC A02/MF A01	DE83780408	MN -2	8:33847
7484	NTIS (US Sales Only), PC A06/MF A01	DE83780406	MN -77	8:33707
7492	NTIS (US Sales Only), PC A04/MF A01	DE83780410	MN -2	8:33694
7502	NTIS (US Sales Only), PC A07/MF A01	DE83780409	MN -2	8:33817
7545	NTIS (US Sales Only), PC A14/MF A01	DE83780441	MN -41	8:34586
7605	NTIS (US Sales Only), PC A05/MF A01	DE83780517	MN -41	8:34425
7626(Vol.1)	NTIS (US Sales Only), PC A11/MF A01	DE83780489	MN -34	8:34878
7626(Vol.2)	NTIS (US Sales Only), PC A05/MF A01	DE83780490	MN -34	8:34722
7626(Vol.3)	NTIS (US Sales Only), PC A09/MF A01	DE83780486	MN -34	8:34781
7675	NTIS (US Sales Only), PC A07/MF A01	DE83780488	MN -34A	8:34723
7678	NTIS (US Sales Only), PC A09/MF A01	DE83780492	MN -34D	8:34761
7685	NTIS (US Sales Only), PC A15/MF A01	DE83780503	MN -11	8:33184
7751	NTIS (US Sales Only), PC A03/MF A01	DE83780524	MN -2	8:34675
INIS-SU-				
144	NTIS (US Sales Only), PC A05/MF A01	DE83780487	MN -34	8:34682
152	NTIS (US Sales Only), PC A06/MF A01	DE83780520	MN -34D	8:34763
157	NTIS (US Sales Only), PC A16/MF A01	DE83780521	MN -34D	8:34743
158	NTIS (US Sales Only), PC A03/MF A01	DE83780523	MN -46	8:34853
INPE-				
2438-PRE/ 139	*See* N-8311012			8:34687
INS-				
427	NTIS (US Sales Only), PC A02/MF A01	DE83701198	MN -34D	8:34782
432	NTIS (US Sales Only), PC A02/MF A01	DE83701199	MN -34D	8:34783
IPF-				
82-2	NTIS (US Sales Only), PC A06/MF A01	DE83750072	MN -20f	8:34895
82-4	NTIS (US Sales Only), PC A03/MF A01	DE83750064	MN -20f	8:34896
82-5	NTIS (US Sales Only), PC A03/MF A01	DE83750073	MN -20g	8:34897
82-7	NTIS (US Sales Only), PC A03/MF A01	DE83750065	MN -20f	8:34898
IPP-				
1/ 206	NTIS (US Sales Only), PC A02/MF A01	DE83750054	MN -20d	8:34927
IPPJ-				
532	NTIS (US Sales Only), PC A02/MF A01	DE83701206	MN -34A	8:34726
535	NTIS (US Sales Only), PC A03/MF A01	DE83701207	MN -34A	8:34737
IVL-B-				
588	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750491	MN -11	8:33056
668	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750516	MN -61a	8:33327
678	NTIS (US Sales Only), PC A04/MF A01	DE83750520	MN -92b	8:33152
679	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750519	MN -11	8:33278
JAERI-M-				
9902	NTIS (US Sales Only), PC A04/MF A01	DE83701208	MN -34A	8:34899
JTI-				
38	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750545	MN -61a	8:33328
Juel-				
1752	NTIS (US Sales Only), PC A06/MF A01	DE83750102	MN -77	8:33685
1782	NTIS (US Sales Only), PC A03/MF A01	DE83750075	MN -77	8:33747
1784	NTIS (US Sales Only), PC A04/MF A01	DE83750076	MN -11	8:34667
1785	NTIS (US Sales Only), PC A07/MF A01	DE83750074	MN -77	8:33686
1813	NTIS (US Sales Only), PC A06/MF A01	DE83750864	MN -93	8:33879
Juel-Spez-				
133/ Bd.2	NTIS (US Sales Only), PC A07/MF A01	DE83750063	MN -98	8:33827
134	NTIS (US Sales Only), PC A04/MF A01	DE83750096	MN -86	8:34426
142	NTIS (US Sales Only), PC A04/MF A01	DE83750077	MN -85	8:34218
154	NTIS (US Sales Only), PC A03/MF A01	DE83750101	MN -77	8:33708
155	NTIS (US Sales Only), PC A11/MF A01; 1	DE83750377	MN -60	8:33593
166	NTIS (US Sales Only), PC A11/MF A01	DE83750896	MN -98F	8:33792
186	NTIS (US Sales Only), PC A03/MF A01	DE83750897	MN -4	8:34053
KFK-				
3295	NTIS (US Sales Only), PC A03/MF A01	DE83750103	MN -2	8:33818
3297	NTIS (US Sales Only), PC A02/MF A01	DE83750110	MN -2	8:34954
3302	NTIS (US Sales Only), PC A03/MF A01	DE83750053	MN -34C	8:34792
3306	NTIS (US Sales Only), PC A02/MF A01	DE83750109	MN -32	8:34958
3347	NTIS (US Sales Only), PC A04/MF A01	DE83750111	MN -34C	8:34807
3412	NTIS (US Sales Only), PC A03/MF A01	DE83750392	MN -34C	8:34811
KFK-CAD-				
202	NTIS (US Sales Only), PC A06/MF A01	DE83750376	MN -38	8:34219
KFK-PTWT-				
1	NTIS (US Sales Only), PC A05/MF A01	DE83780620	MN -23	8:34588
KFTI-				
81-49	NTIS (US Sales Only), PC A05/MF A01	DE83780484	MN -20	8:34793
KHM-TR-				
16	NTIS (US Sales Only), PC A03/MF A01	DE83750472	MN -11	8:33062
17	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750471	MN -90i	8:33063
20	*See* SVF-125	DE83750473	MN -90b	8:33085
21	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750470	MN -90b	8:32958
22	NTIS (US Sales Only), PC A05/MF A01	DE83750514	MN -90i	8:33057
L-				
15245	*See* N-8231646			8:34235
LA-				
7971-MS	NTIS, PC A11/MF A01; 1	DE83011871	MN -70	8:33246
9649-PR	*See* NUREG/CR-2814-Vol.3	DE83012412	MN -80	8:33759

Report No.	Availability	Order No.	Distribution Category	Abstract No.
LA-UR-				
83-147	NTIS, PC A02/MF A01; 1	DE83006055	MN -32	8:34213
83-148	NTIS, PC A03/MF A01	DE83006056	MN -32	8:33726
83-658	NTIS MF A01; 2	DE83010162	MN -38	8:33748
83-775	NTIS, PC A02/MF A01	DE83011109	MN -28	8:34282
83-990	NTIS, PC A02/MF A01	DE83011311	MN -59c	8:33406
83-995	NTIS, PC A02/MF A01	DE83011312	MN -34A	8:34864
83-999	NTIS, PC A03/MF A01	DE83011110	MN -38	8:34928
83-1014	NTIS, PC A03/MF A01	DE83011333	MN -34B	8:34696
83-1027	NTIS, PC A02/MF A01	DE83011330	MN -34A	8:34865
83-1060	NTIS, PC A02/MF A01; 1	DE83011321	MN -15	8:34054
83-1076	NTIS, PC A02/MF A01	DE83011323	MN -48	8:34494
83-1080	NTIS, PC A02/MF A01	DE83011324	MN -38	8:34231
83-1087	NTIS, PC A02/MF A01	DE83011167	MN -21	8:34929
83-1107	NTIS, PC A02/MF A01	DE83011169	MN -25	8:33962
83-1114	NTIS, PC A02/MF A01	DE83011171	MN -59c	8:33407
83-1115	NTIS, PC A02/MF A01	DE83011172	MN -15	8:34055
83-1151	NTIS, PC A02/MF A01	DE83011139	MN -48	8:34617
83-1152	NTIS, PC A02/MF A01	DE83011140	MN -20c	8:34930
83-1168	NTIS, PC A02/MF A01; 1	DE83011143	MN -80	8:33692
83-1175	NTIS, PC A02/MF A01; 1	DE83011147	MN -21	8:34931
83-1197	NTIS, PC A02/MF A01	DE83011148	MN -38	8:34854
83-1201	NTIS, PC A02/MF A01	DE83011149	MN -32	8:34959
83-1226	NTIS, PC A02/MF A01	DE83011180	MN -32	8:34960
83-1238	NTIS, PC A02/MF A01	DE83011182	MN -78	8:33749
83-1248	NTIS, PC A02/MF A01	DE83011183	MN -79b	8:33689
83-1251	NTIS, PC A02/MF A01	DE83011184	MN -38	8:34220
83-1275	NTIS, PC A02/MF A01	DE83011294	MN -32	8:34961
LBL-				
91-Rev(2)	NTIS PC E03/MF A01; 1	DE83011259	STD -34C	8:34750
10593	NTIS, PC A12/MF A01; 1	DE83012439	MN -34	8:34795
14026	NTIS, PC A02/MF A01	DE83011560	MN -59a	8:33893
14790	NTIS, PC A02/MF A01	DE83011681	MN -95d	8:33894
14846-Rev.	NTIS, PC A02/MF A01	DE83011688	MN -41	8:33750
15088	NTIS, PC A02/MF A01	DE83011682	MN -28	8:34314
15108	NTIS, PC A02/MF A01; 1	DE83011676	MN -28	8:34315
15117	NTIS, PC A02/MF A01	DE83011703	MN -28	8:34283
15119	NTIS, PC A02/MF A01; 1	DE83011679	MN -28	8:34270
15132	NTIS, PC A02/MF A01; 1	DE83011691	MN -28	8:34284
15136	NTIS, PC A02/MF A01	DE83011678	MN -28	8:34316
15137	NTIS, PC A02/MF A01; 1	DE83011692	MN -28	8:34285
15140	NTIS, PC A02/MF A01	DE83011686	MN -28	8:34286
15141	NTIS, PC A02/MF A01; 1	DE83011680	MN -28	8:34287
15142	NTIS, PC A02/MF A01; 1	DE83011677	MN -28	8:34271
15146	NTIS, PC A02/MF A01; 1	DE83012441	MN -28	8:34288
15147	NTIS, PC A02/MF A01; 1	DE83011675	MN -28	8:34317
15148	NTIS, PC A02/MF A01	DE83011687	MN -28	8:34318
15157	NTIS, PC A02/MF A01	DE83012470	MN -28	8:34319
15158	NTIS, PC A02/MF A01	DE83011685	MN -28	8:34289
15208	NTIS, PC A02/MF A01; 1	DE83011668	MN -28	8:34290
15234	NTIS, PC A02/MF A01; 1	DE83011702	MN -28	8:34291
15254	NTIS, PC A18/MF A01; 1	DE83011589	MN -34A	8:34881
15463	NTIS, PC A02/MF A01	DE83012469	MN -4	8:34178
15468	NTIS, PC A02/MF A01	DE83012440	MN -34	8:34738
15607	NTIS, PC A22/MF A01	DE83011737	MN -94cc	8:33963
15646	NTIS, PC A02/MF A01	DE83011566	MN -4	8:34739
15651	NTIS, PC A02/MF A01	DE83011672	MN -32	8:34962
15671	NTIS, PC A17/MF A01; 1	DE83012478	MN -66a	8:33557
15799	NTIS, PC A03/MF A01	DE83011674	MN -4	8:34212
15816	NTIS, PC A08/MF A01; 1	DE83011034	STD -69	8:33175
15817	NTIS, PC A08/MF A01	DE83012483	MN -61a	8:33275
15842	NTIS, PC A12/MF A01; 1	DE83011742	MN -34	8:34091
15848	NTIS, PC A02/MF A01; 1	DE83011684	MN -28	8:34320
15866	NTIS, PC A02/MF A01	DE83011673	MN -37	8:34379
15874	NTIS, PC A03/MF A01	DE83012476	MN -34C	8:34808
15875	NTIS, PC A06/MF A01; 1	DE83012438	MN -4	8:34823
15907	NTIS, PC A02/MF A01; 1	DE83012443	MN -95d	8:33895
15956	NTIS, PC A08/MF A01	DE83012437	MN -25	8:33964
15963	NTIS, PC A02/MF A01; 1	DE83012442	MN -28	8:34292
LUTFD2/TFKF-				
3021/ 1-120/ 79	NTIS (US Sales Only), PC A06; 3	DE83750463	MN -11	8:34399
LUTKDH/TKMB-				
1002/ 150(1981)	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750457	MN -61a	8:33329
MEA-				
2012-Vol.1	*See* NUREG/CR-3228-Vol.1	DE83902052	MN -78	8:33665
2013	*See* NUREG/CR-3230	DE83902017	MN -78	8:33680
MPI-PAE/Extraterr.-				
170	Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.)		MN -93	8:34683
MPQ-				
67	Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.)		MN -93	8:34932
68	Max-Planck-Institut fuer Quantenoptik, Garching (Germany, F.R.)		MN -93	8:34882

Report No.	Availability	Order No.	Distribution Category	Abstract No.
N-				
8230336	NTIS, PC A02/MF A01			8:34010
8230338	NTIS, PC A10/MF A01			8:34011
8230368	NTIS, PC A04/MF A01			8:34232
8230375	NTIS, PC A04/MF A01			8:33997
8230497	NTIS, PC A02/MF A01			8:34221
8230539	NTIS, PC A02/MF A01			8:34727
8230551	NTIS, PC A02/MF A01			8:33998
8230585	NTIS, PC A15/MF A01			8:34432
8230622	Colorado State Univ., Fort Collins (USA)			8:33408
8231443	NTIS, PC A02/MF A01			8:33330
8231446	NTIS, PC A02/MF A01			8:34016
8231499	NTIS, PC A06/MF A01			8:33926
8231507	NTIS, PC A04/MF A01			8:34963
8231641	NTIS, PC A09/MF A01			8:34255
8231642	NTIS, PC A02/MF A01			8:34233
8231643	NTIS, PC A12/MF A01			8:34234
8231646	NTIS, PC A03/MF A01			8:34235
8231655	NTIS, PC A03/MF A01			8:34679
8231657	NTIS, PC A06/MF A01			8:34236
8231661	NTIS, PC A06/MF A01			8:34246
8231727	NTIS, PC A02/MF A01			8:34395
8232059	NTIS, PC A12/MF A01			8:34740
8232064	NTIS, PC A12/MF A01			8:34741
8232071	NTIS, PC A12/MF A01			8:34237
8311007	NTIS, PC A03/MF A01			8:34684
8311010	NTIS, PC A02/MF A01			8:34685
8311011	NTIS, PC A02/MF A01			8:34686
8311012	NTIS, PC A03/MF A01			8:34687
8313047	NTIS, PC A03/MF A01			8:34688
8313048	NTIS, PC A02/MF A01			8:34689
8313058	GPO			8:33809
8314057	NTIS, PC A02/MF A01			8:34690
8314058	NTIS, PC A03/MF A01			8:34691
NASA-CR-				
165840	*See* N-8230338			8:34011
165907	*See* N-8230375			8:33997
166343	*See* N-8230551			8:33998
166367	*See* N-8230497			8:34221
166372	*See* N-8230585			8:34432
167978	*See* DOE/NASA/0059-1	DE83011771	STD -96	8:33951
169273	*See* N-8231661			8:34246
169293	*See* N-8231641			8:34255
169294	*See* N-8231642			8:34233
169295	*See* N-8231643			8:34234
169562	*See* N-8314057			8:34690
NASA-TM-				
76936	*See* N-8230539			8:34727
82892	*See* N-8231443			8:33330
83359	*See* DOE/NASA/51040-46	DE83011470	STD -96	8:33948
83963	*See* N-8311007			8:34684
83983	*See* N-8311011			8:34686
83992	*See* N-8311010			8:34685
84265	*See* N-8231727			8:34395
84532	*See* N-8231446			8:34016
84929	*See* N-8313047			8:34688
85148	*See* N-8314058			8:34691
NASA-TP-				
2038	*See* N-8231646			8:34235
2089	*See* N-8313048			8:34689
NE-BF-				
81-2	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750485	MN -61a	8:33331
81-6	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750460	MN -61	8:33332
82-8	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750486	MN -92a	8:33160
NE-EO-				
81-14	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750526	MN -61a	8:33333
81-15	NTIS (US Sales Only), PC A05/MF A01	DE83750522	MN -61a	8:33334
82-2	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750531	MN -61a	8:33335
82-4	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750525	MN -61a	8:33336
82-5	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750530	MN -61a	8:33337
NE/FBA-				
81-4	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750478	MN -94c	8:33821
NE-SBT-				
81-7	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750547	MN -61a	8:33338
81-9	NTIS (US Sales Only), PC A12/MF A01; 1	DE83750546	MN -61a	8:33339
81-17	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750517	MN -61a	8:33340
81-19	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750528	MN -61a	8:33341
81-20	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750505	MN -90	8:33076
81-25	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750527	MN -61a	8:33342
81-38	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750461	MN -61c	8:33343
81-42	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750538	MN -90	8:33080
82-1	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750524	MN -61a	8:33344
82-3	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750523	MN -61a	8:33345
82-11	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750462	MN -61	8:33876
82-16	NTIS (US Sales Only), PC A04/MF A01	DE83750543	MN -61a	8:33346

Report No.	Availability	Order No.	Distribution Category	Abstract No.
82-18	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750537	MN -61a	8:33347
NE-TEKNIK-				
81-1	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750497	MN -66a	8:33552
81-2	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750512	MN -64	8:33579
81-3	NTIS (US Sales Only), MF A01; 2	DE83750502	MN -64	8:33580
81-6	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750515	MN -90e	8:33088
81-11	NTIS (US Sales Only), PC A12/MF A01; 1	DE83750541	MN -64	8:33581
82-1	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750480	MN -64	8:33582
82-5b	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750468	MN -64	8:33583
NE-TFS-				
81-1	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750501	MN -97a	8:33584
NE/TORV-				
81-4	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750506	MN -90b	8:33081
NE-VIND-				
81-7	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750479	MN -60	8:33601
81-26	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750490	MN -97a	8:33602
81-28	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750500	MN -37	8:33587
82-4	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750498	MN -60	8:33603
82-16	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750539	MN -60	8:33604
82-18	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750508	MN -60	8:33605
82-19	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750509	MN -60	8:33606
82-20	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750511	MN -60	8:33607
82-21	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750503	MN -60	8:33588
82-22	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750504	MN -60	8:33608
82-25	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750507	MN -60	8:33609
82-26	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750513	MN -60	8:33591
NP-				
3750446	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750446	MN -61a	8:33348
3750447	NTIS (US Sales Only), PC A02/MF A01	DE83750447	MN -61a	8:33349
3750458	NTIS (US Sales Only), PC A12/MF A01; 1	DE83750458	MN -98	8:33828
3750467	NTIS (US Sales Only), PC A07/MF A01	DE83750467	MN -4	8:33884
3750477	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750477	MN -90i	8:33064
3750481	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750481	MN -61a	8:33350
3750482	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750482	MN -61a	8:33351
3750484	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750484	MN -98F	8:33877
3750540	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750540	MN -95d	8:33896
3770047	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770047	MN -97b	8:33868
3770048	NTIS (US Sales Only), PC A03/MF A01	DE83770048	MN -92	8:33797
3770049	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770049	MN -95d	8:33897
3770050	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770050	MN -92	8:33134
3770051	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770051	MN -98F	8:33829
3770052	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770052	MN -90b	8:33082
3770053	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770053	MN -88	8:33065
3770055	NTIS (US Sales Only), PC A07/MF A01	DE83770055	MN -97	8:33869
3770056	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770056	MN -98F	8:33803
3770057	NTIS (US Sales Only), PC A03/MF A01	DE83770057	MN -92	8:33148
3770058	NTIS (US Sales Only), MF A01; 2	DE83770058	MN -97b	8:33941
3770059	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770059	MN -98F	8:33830
3770060	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770060	MN -98F	8:33788
3770061	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770061	MN -94a	8:33781
3770062	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770062	MN -25	8:33965
3770063	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770063	MN -4	8:34092
3770064	NTIS (US Sales Only), PC A11/MF A01; 1	DE83770064	MN -4	8:34173
3770065	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770065	MN -88	8:33099
3770066	NTIS (US Sales Only), PC A12/MF A01; 1	DE83770066	MN -25	8:33966
3770067	NTIS (US Sales Only), PC A04/MF A01; 1	DE83770067	MN -4	8:33263
3770068	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770068	MN -38	8:33949
3770069	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770069	MN -41	8:34610
3770089	NTIS (US Sales Only), PC A02/MF A01	DE83770089	MN -95	8:33898
3770090	Bundesministerium fuer Forschung und Technologie, Bonn, Germany, F.R.		MN -96	8:33927
3770091	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770091	MN -95d	8:33899
3770092	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770092	MN -98F	8:33831
3770093	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770093	MN -98F	8:33832
3770094	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770094	MN -98F	8:33789
3770095	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770095	MN -98F	8:33790
3770096	NTIS (US Sales Only), PC A02/MF A01	DE83770096	MN -98F	8:33833
3770097	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770097	MN -98F	8:33834
3770098	NTIS (US Sales Only), PC A02/MF A01	DE83770098	MN -98F	8:33835
3770099	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770099	MN -98F	8:33836
3770100	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770100	MN -98F	8:33837
3770101	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770101	MN -41	8:34623
3770102	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770102	MN -48	8:34624
3770103	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770103	MN -41	8:34625
3770104	NTIS (US Sales Only), PC A07/MF A01	DE83770104	MN -98F	8:33838
3770105	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770105	MN -90c	8:32959
3770106	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770106	MN -90	8:33096
3770107	NTIS (US Sales Only), PC A04/MF A01; 1	DE83770107	MN -59a	8:33409
3770108	NTIS (US Sales Only), PC A02/MF A01	DE83770108	MN -98F	8:33839
3770109	NTIS (US Sales Only), PC A08/MF A01	DE83770109	MN -96	8:33950
3770110	NTIS (US Sales Only), PC A02/MF A01	DE83770110	MN -98F	8:33840
3770111	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770111	MN -98G	8:33870
3770112	NTIS (US Sales Only), PC A21/MF A01; 1	DE83770112	MN -98F	8:33841
3770113	NTIS (US Sales Only), PC A09/MF A01	DE83770113	MN -90b	8:33083
3770114	NTIS (US Sales Only), PC A17/MF A01; 1	DE83770114	MN -93	8:33848

Report No.	Availability	Order No.	Distribution Category	Abstract No.
3770115	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770115	MN -41	8:34626
3770116	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770116	MN -41	8:34627
NSF-				
82-57	*See* N-8313058			8:33809
NSFI-OR-				
221-21281-53-04	NTIS (US Sales Only), PC A03/MF A01	DE83750552	MN -92	8:33153
NSFI-R-				
97-80	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750553	MN -92	8:33154
NUREG-				
0580-Vol.12-No.4	NTIS, PC A04/MF A01 - GPO	DE83901722	MN -80	8:33695
0728-Rev.1	NTIS, PC A03/MF A01 - GPO $3.75	DE83901744	MN -80	8:33751
0892-Suppl.No.3	NTIS, PC A04/MF A01 - GPO $4.75	DE83902085	MN -78	8:33752
0896-Suppl.1	NTIS, PC A03/MF A01 - GPO $4.50	DE83901756	MN -78	8:33696
0936-Vol.2-No.1	NTIS, PC A09/MF A01 - GPO	DE83901737	MN -2	8:33697
0941	NTIS, PC A02/MF A01 - GPO $3.50	DE83902112	MN -41	8:33247
0954-Suppl.1	NTIS, PC A04/MF A01 - GPO $4.75	DE83901757	MN -78	8:33698
0968-Suppl.1	NTIS, PC A03/MF A01 - GPO $4.50	DE83901709	MN -80	8:33699
0987	NTIS, PC A07/MF A01; 1 - $GPO $6.50	DE83902022	MN -11	8:33181
0999	NTIS, PC A05/MF A01 - GPO $5.50	DE83902119	MN -78	8:33753
1000-Vol.1	NTIS, PC A07/MF A01; 1 - GPO $6.50	DE83901791	MN -78	8:33754
NUREG/CR-				
2000-Vol.2-No.4	NTIS, PC A06/MF A01; - GPO	DE83011885	MN -80	8:33755
2568	NTIS, PC A07/MF A01; 1 - GPO $6.00	DE83902161	MN -78	8:33756
2650-R4	NTIS, PC A03/MF A01	DE83011738	MN -41	8:33757
2716-Vol.4	NTIS, PC A04/MF A01; 1 - GPO $5.00	DE83012248	MN -80	8:33758
2814-Vol.3	NTIS, PC A03/MF A01; 1	DE83012412	MN -80	8:33759
2874-Vol.3	NTIS, PC A03/MF A01 - GPO	DE83011872	MN -77	8:33760
2924	NTIS, PC A04/MF A01; 1 - GPO $5.00	DE83012448	MN -70	8:33240
3012-Vol.1	NTIS, PC A02/MF A01 - GPO $3.25	DE83012497	MN -41	8:33761
3012-Vol.2	NTIS, PC A05/MF A01; 1 - GPO $5.50	DE83012498	MN -41	8:33762
3012-Vol.3	NTIS, PC A07/MF A01 - GPO $6.50	DE83012489	MN -41	8:33763
3013	NTIS, PC A03/MF A01; 1 - GPO $4.75	DE83011868	MN -78	8:33764
3016	NTIS, PC A03/MF A01 - GPO $4.75	DE83011952	MN -11	8:34415
3155	NTIS, PC A03/MF A01	DE83011604	MN -78	8:33765
3173	NTIS, PC A10/MF A01; 1 - GPO $7.00	DE83901749	MN -11	8:34433
3185	NTIS, PC A08/MF A01; 1 - GPO	DE83012294	MN -41	8:33766
3207	NTIS, PC A24/MF A01; 1 - GPO $8.50	DE83902084	MN -11	8:34668
3217	NTIS, PC A04/MF A01 - GPO $5.00	DE83011857	MN -80	8:33730
3226	NTIS, PC A13/MF A01; 1 - GPO $8.00	DE83011946	MN -78	8:33767
3228-Vol.1	NTIS, PC A06/MF A01; 1 - GPO $5.50	DE83902052	MN -78	8:33665
3230	NTIS, PC A03/MF A01; 1 - GPO $4.50	DE83902017	MN -78	8:33680
3235-Vol.1	NTIS, PC A02/MF A01; 1	DE83011884	MN -70	8:33221
3235(Vols.2-3-4)	NTIS, PC A14/MF A01 - GPO $9.00	DE83012458	MN -70	8:33252
3235-Vols.5-6	NTIS, PC A07/MF A01; 1 - GPO $6.50	DE83012241	MN -70	8:33248
NUS-				
3440-Rev.1	NTIS, PC A06/MF A01; 1	DE83011954	MN -70B	8:33222
NYSERDA-				
82-30	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		MN -95d	8:33352
83-1	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		MN -95d	8:33935
ONWI-				
314	NTIS, PC A05/MF A01; 1	DE83011941	MN -70	8:34670
415	NTIS, PC A05/MF A01	DE83011942	MN -70	8:34671
419	NTIS (US Sales Only), PC A06/MF A01	DE83011664	MN -70	8:33223
421	NTIS (US Sales Only)PC E06/MF A01; 1	DE83012467	MN -70	8:34672
431	NTIS (US Sales Only), E08/MF A01	DE83011661	MN -70	8:34601
432	NTIS (US Sales Only), PC A08/MF A01; 1	DE83012466	MN -70	8:33241
433	NTIS (US Sales Only), PC E08/MF A01; 1	DE83011667	MN -70	8:33242
435	NTIS (US Sales Only), PC E09/MF A01; 1	DE83011660	MN -70	8:34676
436	NTIS (US Sales Only), PC E10/MF $5.50; 1	DE83011518	MN -70	8:33224
446	NTIS (US Sales Only), PC A10/MF A01; 1	DE83012468	MN -70	8:33251
ORNL-				
5723	NTIS, PC A04/MF A01; 1	DE83012525	STD -90d	8:34964
5940	NTIS, PC A07/MF A01; 1	DE83012524	STD -66d	8:33565
5943	NTIS, PC A05/MF A01	DE83012533	STD -25	8:33953
5949	NTIS, PC A05/MF A01; 1	DE83012299	STD -04	8:34059
5999	NTIS, PC A12/MF A01; 1	DE83010394	STD -11	8:34400
ORNL/CON-				
114	NTIS, PC A03/MF A01	DE83012372	MN -94a	8:33900
122	NTIS, PC A12/MF A01; 1	DE83012298	MN -95d	8:33901
ORNL/CSD/TM-				
198	NTIS PC E03/MF A01	DE83012134	MN -20b	8:34933
ORNL/MIT-				
357	NTIS, PC A04/MF A01; 1	DE83011766	MN -90i	8:33067
361	NTIS, PC A04/MF A01	DE83011765	MN -90i	8:33058
ORNL/NSIC-				
200-Vol.2-No.4	*See* NUREG/CR-2000-Vol.2-No.4	DE83011885	MN -80	8:33755
ORNL/TM-				
8403	NTIS, PC A02/MF A01	DE83012307	STD -20f	8:34900
8443/ Vol.3	*See* NUREG/CR-2874-Vol.3	DE83011872	MN -77	8:33760
8467	NTIS, PC A04/MF A01	DE83012141	STD -20g	8:34901
8539	NTIS, PC A05/MF A01; 1	DE83012302	MN -70	8:33228
8576	NTIS, PC A03/MF A01	DE83012526	STD -90d	8:32960
8618	NTIS PC E08/MF A01; 1	DE83012138	MN -90e	8:34256

Report No.	Availability	Order No.	Distribution Category	Abstract No.
8648	NTIS, PC A04/MF A01	DE83012340	STD -20	8:34902
8649	*See* NUREG/CR-3155	DE83011604	MN -78	8:33765
8714	NTIS, PC A03/MF A01	DE83012527	STD -4	8:33783
8716	NTIS, PC A02/MF A01	DE83012140	MN -80	8:33734
8749	NTIS, PC A03/MF A01	DE83012139	MN -04	8:34402
8790	NTIS, PC A12/MF A01; 1	DE83012297	MN -95d	8:33709
PATENTS-US-	(US: Commissioner of Patents, Washington, D.C. 20231, USA, $1.00 per copy. Government Patent Applications available from NTIS)			
3,715,195				8:33010
PB-				
82-922811	NTIS PC $6.00/MF$3.00			8:34553
82-922916	NTIS PC $6.00/MF$3.00			8:34602
83-122564	NTIS, PC A25/MF A01			8:33793
83-125013	NTIS, PC A12/MF A01			8:34475
83-125773	NTIS, PC A03/MF A01			8:34860
83-126383	NTIS, PC A03/MF A01			8:34403
83-126433	NTIS, PC A02/MF A01			8:34628
83-126458	NTIS, PC A02/MF A01			8:34629
83-127365	NTIS, PC A02/MF A01			8:34630
83-127407	NTIS, PC A04/MF A01			8:34603
83-129551	NTIS, PC A10/MF A01			8:33100
83-130252	NTIS, PC A02/MF A01			8:34631
83-132001	NTIS, PC A02/MF A01			8:34632
83-132019	NTIS, PC A08/MF A01			8:34604
83-132811	NTIS, PC A12/MF A01			8:34455
83-132910	NTIS, PC A02/MF A01			8:34404
83-133173	NTIS PC E06/MF E06			8:33308
83-133249	NTIS PC E03/MF E03			8:34633
83-133843	NTIS PC E05/MF E05			8:33798
83-133900	NTIS, PC A09/MF A01			8:34634
83-133918	NTIS, PC A04/MF A01			8:34434
83-134221	Pub. in Proceedings of Recent Advances in Brachtherapy Physics, Strubridge, MA., October 5-6, 1979, p22-31 1981.			8:34554
83-134759	NTIS, PC A02/MF A01			8:33804
83-135905	NTIS, PC A06/MF A01			8:34635
83-135947	NTIS, PC A20/MF A01			8:33799
83-137190	NTIS, PC A03/MF A01			8:34405
83-156794	NTIS, PC A02/MF A01			8:33077
83-157685	NTIS, PC A03/MF A01			8:33078
83-159475	NTIS, PC A21/MF A01			8:33155
83-159665	NTIS, PC A04/MF A01			8:34416
83-159798	NTIS, PC A07/MF A01			8:34417
83-159889	NTIS, PC A11/MF A01			8:33156
83-162917	NTIS, PC A02/MF A01			8:33229
83-162925	NTIS, PC A02/MF A01			8:33230
83-162933	NTIS, PC A07/MF A01			8:33231
83-165464	NTIS, PC A03/MF A01			8:33243
83-928600	Paper copy available on subscription, North American Continent price, $45.00/year; all others write for quote. Also available in single copies.			8:33842
83-937600	Paper copy available on subscription, North American Continent price, $30.00/year; all others write for quote. Also available in single copies.			8:34555
PNL-				
4275-4	*See* NUREG/CR-2716-Vol.4	DE83012248	MN -80	8:33758
4434	*See* NUREG/CR-2924	DE83012448	MN -70	8:33240
4465	NTIS, PC A11/MF A01; 1	DE83011776	MN -70	8:33188
4510-Vol.1	*See* NUREG/CR-3012-Vol.1	DE83012497	MN -41	8:33761
4510-Vol.2	*See* NUREG/CR-3012-Vol.2	DE83012498	MN -41	8:33762
4510-Vol.3	*See* NUREG/CR-3012-Vol.3	DE83012489	MN -41	8:33763
4516	*See* NUREG/CR-3016	DE83011952	MN -11	8:34415
4526	NTIS, PC A05/MF A01; 1	DE83011878	STD -60	8:33589
4657	NTIS, PC A05/MF A01	DE83011777	MN -41	8:34435
4662	*See* NUREG/CR-3217	DE83011857	MN -80	8:33730
4717	NTIS, PC A05/MF A01	DE83012522	MN -95d	8:33902
PNL-SA-				
9012	Am. Astron. Soc., Bull., 13: No. 1, 363-364(1981)			8:34694
10934	NTIS, PC A02/MF A01	DE83011950	MN -70	8:33232
11289	NTIS, PC A02/MF A01	DE83011577	MN -70	8:33967
PPPL-				
1990	NTIS, PC A03/MF A01	DE83012421	STD -20f	8:34903
1994	NTIS, PC A03/MF A01	DE83012427	STD -20d	8:34934
1995	NTIS, PC A02/MF A01	DE83012426	STD -20d	8:34904
1996	NTIS, PC A03/MF A01	DE83012425	STD -20a	8:34905
1997	NTIS, PC A04/MF A01; 1	DE83012424	STD -20e	8:34935
1999	NTIS, PC A03/MF A01	DE83012430	STD -20f	8:34906
2000	NTIS, PC A03/MF A01	DE83012429	STD -20a	8:34936
2004	NTIS, PC A02/MF A01	DE83012433	STD -20g	8:34937
2007	NTIS, PC A02/MF A01	DE83012432	STD -20g	8:34907
PTB-FMRB-				
89	NTIS (US Sales Only), PC A04/MF A01	DE83750097	MN -32	8:34965
PUBL-				
259	*See* N-8231655			8:34679

Report No.	Availability	Order No.	Distribution Category	Abstract No.
RFP-				
3358	NTIS, PC A04/MF A01; 1	DE83012274	STD -60	8:33610
3488	NTIS, PC A05/MF A01	DE83012273	STD -60	8:33611
3499	NTIS, PC A02/MF A01	DE83012431	STD -37	8:34387
3508	NTIS, PC A22/MF A01; 1	DE83012265	STD -60	8:33612
RFP-Trans-				
399	NTIS, PC A02/MF A01	DE83011637	MN -4	8:33944
RHO-BW-ST-				
36P	NTIS, PC A04/MF A01; 1	DE83011928	MN -70	8:33233
RHO-HS-SA-				
19-P	NTIS, PC A02/MF A01; 1	DE83010930	MN -70B	8:33244
RL-				
82-075	NTIS (US Sales Only), PC A08/MF A01	DE83780485	MN -34B	8:34692
RRK-				
81-13	NTIS (US Sales Only), PC A03/MF A01	DE83701200	MN -34D	8:34784
81-16	NTIS (US Sales Only), PC A02/MF A01	DE83701201	MN -34D	8:34785
81-19	NTIS (US Sales Only), PC A02/MF A01	DE83701202	MN -34D	8:34786
81-21	NTIS (US Sales Only), PC A02/MF A01	DE83701203	MN -34D	8:34787
81-24	NTIS (US Sales Only), PC A02/MF A01	DE83701204	MN -34D	8:34883
81-25	NTIS (US Sales Only), PC A02/MF A01	DE83701205	MN -34D	8:34884
SAI-				
254-83-438-LJ	NTIS, PC A03/MF A01	DE83012362	STD -20g	8:34938
SAND-				
82-0774-R4	*See* NUREG/CR-2650-R4	DE83011738	MN -41	8:33757
82-1557-Vol.1	*See* NUREG/CR-3235-Vol.1	DE83011884	MN -70	8:33221
82-1557(Vols.2-3-4)	*See* NUREG/CR-3235(Vols.2-3-4)	DE83012458	MN -70	8:33252
82-1557-Vols.5-6	*See* NUREG/CR-3235-Vols.5-6	DE83012241	MN -70	8:33248
82-2172	NTIS, PC A02/MF A01	DE83011864	STD -71	8:34222
82-2355	NTIS, PC A25/MF A01; 1	DE83006261	MN -90c	8:32961
82-2364	NTIS, PC A02/MF A01	DE83011845	MN -25	8:34017
82-2441	NTIS, PC A02/MF A01; 1	DE83011869	STD -70	8:34669
82-2450	*See* NUREG/CR-3226	DE83011946	MN -78	8:33767
82-2470C	NTIS, PC A03/MF A01; 1	DE83007276	MN -25	8:34044
82-2498C	NTIS, PC A02/MF A01	DE83011299	MN -25	8:33968
82-2543C	NTIS, PC A02/MF A01; 1	DE83012226	MN -60	8:33613
82-2552C	NTIS, PC A02/MF A01	DE83011501	MN -60	8:33614
82-2795C	NTIS, PC A02/MF A01	DE83011860	MN -34	8:34384
82-7081	*See* NUREG/CR-3185	DE83012294	MN -41	8:33766
82-7156	NTIS, PC A03/MF A01	DE83012295	MN -63e	8:34247
83-0002C	NTIS, PC A02/MF A01	DE83011496	MN -71	8:34223
83-0003C	NTIS, PC A02/MF A01	DE83011498	MN -71	8:34224
83-0004C	NTIS, PC A02/MF A01	DE83011497	MN -15	8:33256
83-0057	NTIS, PC A04/MF A01; 1	DE83011863	STD -90	8:32995
83-0099C	NTIS, PC A02/MF A01	DE83010511	MN -32	8:34966
83-0283	NTIS, PC A04/MF A01; 1	DE83012296	MN -28	8:34229
83-0352C	NTIS, PC A02/MF A01	DE83007295	MN -35	8:34225
83-0378C	NTIS, PC A02/MF A01	DE83011280	MN -34	8:34248
83-0660	NTIS, PC A04/MF A01; 1	DE83012380	MN -70	8:33245
83-0663C	NTIS, PC A04/MF A01	DE83011448	MN -21	8:34939
83-0738	NTIS, PC A02/MF A01; 1	DE83011937	MN -38	8:34226
83-0917C	NTIS, PC A02/MF A01	DE83009697	MN -70	8:34673
83-8213	NTIS, PC A03/MF A01	DE83011930	MN -62c	8:33365
83-8214	NTIS, PC A03/MF A01	DE83011894	MN -25	8:33969
SCP-R-				
2-64-25	NTIS (US Sales Only), PC A02/MF A01	DE83750550	MN -92	8:33142
2-64-28	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750551	MN -92	8:33143
SERI/TP-				
234-1816	NTIS, PC A02/MF A01	DE83009104	STD -62	8:33354
254-1935	NTIS, PC A02/MF A01; 1	DE83010688	MN -59c	8:33410
SLAC-				
255	NTIS, PC A10/MF A01; 1	DE83011922	STD -34D	8:34753
SLAC-PUB-				
2857	NTIS, PC A06/MF A01	DE83011839	MN -34D	8:34788
3073	NTIS, PC A02/MF A01	DE83011514	MN -34D	8:34321
SLU-ISS-				
2-1980	NTIS (US Sales Only), PC A09/MF A01; 1	DE83750542	MN -61a	8:33355
SLU-IVL-				
126	*See* NE-SBT-82-16	DE83750543	MN -61a	8:33346
127	*See* NE-SBT-82-18	DE83750537	MN -61a	8:33347
SMAB-				
9	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750487	MN -61a	8:33012
SNV-PM-				
1494	NTIS (US Sales Only), PC A03/MF A01	DE83750456	MN -61	8:33942
SOL-				
1982-6	NTIS (US Sales Only), PC A02/MF A01	DE83750532	MN -95d	8:33903
SP-RAPP-				
1982:32	*See* PB-83-159665			8:34416
SRD-				
81-088	*See* DOE/NASA/0059-1	DE83011771	STD -96	8:33951
STF-				
88-A81017	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750549	MN -92	8:33144
88-A81033	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750548	MN -92	8:33145
STU-				
78-4160	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750455	MN -95d	8:33936
79-3419	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750518	MN -96	8:33276

Report No.	Availability	Order No.	Distribution Category	Abstract No.
STUDSVIK-EB-				
82-15	NTIS (US Sales Only), PC A03/MF A01	DE83750474	MN -90e	8:33089
STUDSVIK-ET-				
81-160	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750488	MN -95e	8:33937
STUDSVIK-EV-				
81-50	*See* NE-SBT-81-20	DE83750505	MN -90	8:33076
SV-FUD-				
1-7	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750454	MN -90b	8:33084
SV-SOL-				
1982-1	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750536	MN -95d	8:33295
1982-3	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750535	MN -95d	8:33904
1982-4	NTIS (US Sales Only), PC A02/MF A01	DE83750534	MN -95d	8:33905
1982-5	NTIS (US Sales Only), PC A02/MF A01	DE83750533	MN -95d	8:33411
SVF-				
125	NTIS (US Sales Only), PC A09/MF A01; 1	DE83750473	MN -90b	8:33085
SWR-				
6287/ 2	*See* AD-A-124046/4			8:34210
TAC-SPG-				
82-004	Univ. of New Mexico, Technology Application Center, Albuquerque, NM 87131		MN -59	8:33279
TENRAC/ADM-				
80-001	NTIS, PC A05/MF A01; 1	DE83902086	MN -98	8:33860
TENRAC/EDF-				
050	NTIS, PC A05/MF A01; 1	DE83011815	MN -59a	8:33412
TRITA-KUT-				
1025	NTIS (US Sales Only), PC A10/MF A01; 1	DE83750465	MN -11	8:34436
UCID-				
18865-Vol.1	NTIS, PC A05/MF A01; 1	DE83011787	MN -21	8:34940
18865-Vol.2	NTIS, PC A04/MF A01; 1	DE83011786	MN -21	8:34941
18865-Vol.3	NTIS, PC A11/MF A01; 1	DE83011785	MN -21	8:34942
18874-80-Vol.1	NTIS, PC A23/MF A01; 1	DE83011880	MN -11	8:34406
18874-80-Vol.2	NTIS, PC A24/MF A01; 1	DE83011879	MN -11	8:34407
18874-80-Vol.3	NTIS, PC A21/MF A01; 1	DE83011886	MN -11	8:34408
19673	NTIS, PC A03/MF A01	DE83011921	MN -28	8:34293
19694	NTIS, PC A08/MF A01; 1	DE83012301	MN -22	8:33179
19704	NTIS, PC A02/MF A01	DE83011807	MN -78	8:33768
19705	NTIS, PC A02/MF A01	DE83011809	MN -78	8:33769
19749	NTIS, PC A03/MF A01; 1	DE83011778	MN -38	8:34249
19764	NTIS, PC A09/MF A01; 1	DE83012449	MN -70	8:33234
19791	NTIS, PC A02/MF A01	DE83011772	MN -28	8:34861
19793	NTIS, PC A04/MF A01	DE83011936	MN -38	8:34967
19795	NTIS, PC A03/MF A01	DE83011943	MN -38	8:34214
19796	NTIS, PC A02/MF A01	DE83012707	MN -10	8:34060
UCLA-ENG-				
8078	NTIS, PC A15/MF A01; 1	DE83012092	MN -59	8:33540
UCRL-				
15527	NTIS, PC A05/MF A01	DE83011846	MN -4	8:34093
50021-81	NTIS, PC A25/MF A01; 1	DE83011875	STD -21	8:34943
50051-82-3	NTIS, PC A04/MF A01	DE83012343	STD -20	8:34944
53333	NTIS, PC A24/MF A01	DE83011865	STD -20	8:34945
53384	NTIS, PC A03/MF A01	DE83012730	MN -20	8:34946
53404	NTIS, PC A05/MF A01	DE83011810	MN -32	8:34968
86230	NTIS, PC A02/MF A01	DE83002056	MN -2	8:33770
87611-Rev.2	NTIS, PC A02/MF A01	DE83011228	MN -90c	8:32996
87650-Rev.1	NTIS, PC A03/MF A01	DE83012049	MN -90c	8:33070
88211	NTIS, PC A02/MF A01	DE83010819	MN -20d	8:34947
88215	NTIS, PC A02/MF A01	DE83010928	MN -21	8:34948
88232	NTIS, PC A02/MF A01; 1	DE83012104	MN -20	8:34949
88260	NTIS, PC A02/MF A01	DE83012109	MN -28	8:34294
88485	NTIS, PC A02/MF A01	DE83012046	MN -4	8:33970
88486	NTIS, PC A02/MF A01	DE83012047	MN -4	8:33971
88533	NTIS, PC A03/MF A01	DE83012097	MN -38	8:34250
88558	NTIS, PC A02/MF A01	DE83011230	MN -32	8:34969
88704	NTIS, PC A02/MF A01	DE83012111	MN -34D	8:34950
89005	NTIS, PC A02/MF A01	DE83009122	MN -38	8:34215
89024	NTIS, PC A02/MF A01; 1	DE83012103	MN -34C	8:34824
89085	NTIS, PC A02/MF A01; 1	DE83012048	MN -94b	8:33779
89100	NTIS, PC A02/MF A01	DE83010585	MN -38	8:34251
UCRL-Trans-				
11841	NTIS, PC A03/MF A01	DE83011128	MN -2	8:33693
11857	NTIS, PC A02/MF A01	DE83011639	MN -25	8:33999
11858	NTIS, PC A02/MF A01; 1	DE83011415	MN -20g	8:34908
UPTEC-				
8077-E	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750494	MN -25	8:33972
8078-E	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750493	MN -62	8:33541
80121-E	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750495	MN -25	8:33542
USDA-FS-RP-NC-				
200	North Central Forest Experiment Station, USDA - 1992 Folwell Ave., St. Paul, MN 55108		MN -61a	8:33356
USGS-				
MAP-I-1003	NTIS, PC A03/MF A01; 1	DE83011267	MN -51	8:33177
USGS-OFR-				
78-105C	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66b	8:33558

Report No.	*Availability*	*Order No.*	*Distribution Category*	*Abstract No.*
78-105D	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66	8:33559
78-106C	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66b	8:33560
78-107-A	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66	8:33561
78-107-B	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66a	8:33562
78-107-C	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66	8:33563
78-179	USGS, Open File Services, Box 25425, Denver Federal Center, Denver, CO		MN -11	8:34678
78-515	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -51	8:34389
78-798	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -66b	8:33553
78-901	US Geological Survey, Open File Service, Box 25425, Denver Federal Center, Denver, CO		MN -90a	8:33016
78-949	USGS, Open File Services, Box 25425, Denver Federal Center, Denver, CO		MN -51	8:33178
USIP-				
82-02	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750489	MN -98	8:33794
UUIM-				
66	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750496	MN -37	8:33615
VTT-TIED-				
102	Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)		MN -96	8:33928
107	Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)		MN -61a	8:33357
VTT-TUTK-				
82-59	Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)		MN -25	8:33973
108	Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)		MN -61a	8:33358
109	Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)		MN -95	8:33943
WTHD-				
145	*See* N-8231657			8:34236
Y/DV-				
282	NTIS, PC A03/MF A01	DE83011076	MN -25	8:33974

ORDER NUMBER CORRELATION

This correlation list is provided for those organizations where document storage is alphanumeric by report number and request may be received by order number. For other information about a document (abstract number, distribution category, availability, and price), please refer to the Report Number Index.

Order No.	*Report No.*
DE83001908	DOE/MC/16000—1294-VoL4
DE83002056	UCRL—86230
DE83003789	CONF-810622—Vol.2
DE83004943	CONF-830406—Abstr.
DE83005018	DOE/ER/70224—T6
DE83006055	LA-UR—83-147
DE83006056	LA-UR—83-148
DE83006090	CONF-820331—
DE83006261	SAND—82-2355
DE83006600	DOE/MC/14731—T1
DE83006646	DOE/MC/14731—T2
DE83007078	DOE/ET/21105—T1
DE83007200	DOE/ET/10532—T11
DE83007276	SAND—82-2470C
DE83007280	DOE/TIC—3311-S12
DE83007295	SAND—83-0352C
DE83008187	DOE/IG—0160
DE83008483	DOE/ET/12138—1341-Vol.2
DE83008494	DOE/ET/12138—1341-Vol.1
DE83008523	CONF-830607—3
DE83008576	CONF-7411121—2
DE83008591	BNL—32680
DE83009104	SERI/TP—234-1816
DE83009122	UCRL—89005
DE83009682	CONF-830607—4
DE83009697	SAND—83-0917C
DE83009741	CONF-8205140—
DE83009754	DOE/ID/12223—T2
DE83009756	DOE/ID/12223—T3
DE83009820	DOE/R4/10371—T1
DE83010162	LA-UR—83-658
DE83010187	GA-A—16918
DE83010394	ORNL—5999
DE83010511	SAND—83-0099C
DE83010561	CONF-821185—1
DE83010585	UCRL—89100
DE83010592	DP-MS—82-54
DE83010688	SERI/TP—254-1935
DE83010700	CONF-8104202—1
DE83010708	ANL-HEP-CP—82-67
DE83010719	CONF-820448—5
DE83010754	CONF-830607—5
DE83010758	CONF-830622—4
DE83010773	CONF-820434—20
DE83010816	DOE/SR-WM—79-3-Rev.2/83
DE83010817	CONF-820415—
DE83010819	UCRL—88211
DE83010928	UCRL—88215
DE83010930	RHO-HS-SA—19-P
DE83011000	DOE/ET/13153—T9
DE83011014	ANL—82-58
DE83011034	LBL—15816
DE83011059	FERMILAB-Pub—83/25-THY
DE83011076	Y/DV—282
DE83011077	CONF-820971—4
DE83011078	CONF-820371—9
DE83011109	LA-UR—83-775
DE83011110	LA-UR—83-999
DE83011123	BDX—613-2938
DE83011128	UCRL-Trans—11841
DE83011139	LA-UR—83-1151
DE83011140	LA-UR—83-1152
DE83011143	LA-UR—83-1168
DE83011147	LA-UR—83-1175
DE83011148	LA-UR—83-1197
DE83011149	LA-UR—83-1201
DE83011167	LA-UR—83-1087
DE83011169	LA-UR—83-1107
DE83011171	LA-UR—83-1114
DE83011172	LA-UR—83-1115
DE83011180	LA-UR—83-1226
DE83011182	LA-UR—83-1238
DE83011183	LA-UR—83-1248
DE83011184	LA-UR—83-1251
DE83011191	DOE/CH/10104—1
DE83011223	DP-MS—82-93
DE83011224	DP-MS—82-109
DE83011228	UCRL—87611-Rev.2
DE83011230	UCRL—88558
DE83011243	DPSP—82-30-14
DE83011244	DP-MS—82-101
DE83011258	CONF-811174—6
DE83011259	LBL—91-Rev(2)
DE83011261	DOE/NV/10282—1013
DE83011264	DOE/CH/00016—1402
DE83011266	DPST—78-150-2
DE83011267	USGS—MAP-I-1003
DE83011271	DP-MS—82-52
DE83011280	SAND—83-0378C
DE83011289	CONF-830628—4
DE83011291	ANL—83-2
DE83011292	CONF-830628—1
DE83011293	CONF-830543—1
DE83011294	LA-UR—83-1275
DE83011299	SAND—82-2498C
DE83011303	GJBX—12(83)
DE83011311	LA-UR—83-990
DE83011312	LA-UR—83-995
DE83011321	LA-UR—83-1060
DE83011323	LA-UR—83-1076
DE83011324	LA-UR—83-1080
DE83011330	LA-UR—83-1027
DE83011333	LA-UR—83-1014
DE83011344	DOE/ET/10023—4-Vol.1
DE83011345	DOE/ET/10023—4-Vol.2
DE83011346	DOE/ET/10023—4-Vol.3
DE83011347	DOE/ET/10023—4-Vol.4
DE83011351	CONF-830549—1
DE83011352	BNL—32849
DE83011353	BNL—32730
DE83011358	BNL-NUREG—32798
DE83011360	BNL—32770
DE83011361	BNL—32843
DE83011364	BNL—32847
DE83011377	DP-MS—82-60
DE83011378	DP-MS—82-46
DE83011381	DP-MS—82-65
DE83011383	DP-MS—83-4
DE83011388	CONF-830459—1
DE83011390	CONF-830418—4
DE83011396	CONF-830462—1
DE83011398	CONF-830451—4
DE83011402	CONF-830419—7
DE83011404	CONF-830419—6
DE83011409	DOE/NBB—0032-Vol.2
DE83011411	DOE/NBB—0032-Vol.1
DE83011415	UCRL-Trans—11858
DE83011425	CONF-830628—2
DE83011426	CONF-821235—1
DE83011427	CONF-830628—3
DE83011428	CONF-830543—2
DE83011436	FCR—3278
DE83011444	DOE/FE/60181—2
DE83011445	DP-MS—82-96
DE83011446	DP-MS—82-73
DE83011448	SAND—83-0663C
DE83011452	DP-MS—82-94
DE83011470	DOE/NASA/51040—46
DE83011478	DOE/EIA—0394-Vol.2
DE83011479	DOE/EIA—0391
DE83011480	DOE/ER/40048—32-L2
DE83011483	DOE/ER/40048—33-L2
DE83011484	DOE/FE/60181—4
DE83011485	DOE/ER/40048—38-L2
DE83011488	DOE/FE/60181—3
DE83011490	DOE/ET/53088—90
DE83011496	SAND—83-0002C
DE83011497	SAND—83-0004C
DE83011498	SAND—83-0003C
DE83011500	DOE/EV/10502—1
DE83011501	SAND—82-2552C
DE83011510	DOE/PE/70041—T2
DE83011511	DOE/PE/70431—T1
DE83011514	SLAC-PUB—3073
DE83011518	ONWI—436
DE83011528	DOE/PE/70041—T1
DE83011529	DOE/PE/70009—T1
DE83011531	DOE/PE/70472—T1
DE83011532	DOE/PE/70009—T4
DE83011536	DOE/PE/70274—T2
DE83011537	DOE/PE/70009—T2
DE83011538	DOE/RG/10295—T1
DE83011539	DOE/OR/20837—T1
DE83011540	DOE/NBM—3011540
DE83011541	DOE/NBM—3011541
DE83011542	DOE/PE/70274—T1
DE83011543	DOE/PE/70274—T3
DE83011547	DOE/FE/55014—T2
DE83011552	BDX—613-2872
DE83011560	LBL—14026
DE83011566	LBL—15646
DE83011577	PNL-SA—11289
DE83011582	DOE/CS/54277—T1
DE83011584	DOE/ER/40008—33
DE83011589	LBL—15254
DE83011591	CONF-830518—3
DE83011600	DOE/NOAA/OTEC—24(Vol.1)
DE83011604	NUREG/CR—3155
DE83011608	DP-MS—82-81
DE83011609	DP-MS—82-61
DE83011615	DOE/ER/40048—23P2
DE83011617	DOE/ER/40048—26-P2
DE83011618	DOE/ER/40048—25-P2
DE83011620	BNL—32905
DE83011623	BNL—32898
DE83011624	BNL—32891
DE83011632	DOE/SF/11563—T1
DE83011634	DP-MS—83-2
DE83011637	RFP-Trans—399
DE83011639	UCRL-Trans—11857
DE83011640	BNL—32902

Order No.	Report No.
DE83011641	BNL—32929
DE83011642	BNL—32904
DE83011647	BNL—32855
DE83011648	BNL—32788
DE83011650	BNL—32910
DE83011651	BNL-NUREG—32897
DE83011653	BNL—32658
DE83011655	DOE/EIA—0130(83/04)
DE83011656	CONF-830130—
DE83011657	ANL/CNSV-TM—114
DE83011658	ANL/CNSV-TM—112
DE83011660	ONWI—435
DE83011661	ONWI—431
DE83011664	ONWI—419
DE83011667	ONWI—433
DE83011668	LBL—15208
DE83011672	LBL—15651
DE83011673	LBL—15866
DE83011674	LBL—15799
DE83011675	LBL—15147
DE83011676	LBL—15108
DE83011677	LBL—15142
DE83011678	LBL—15136
DE83011679	LBL—15119
DE83011680	LBL—15141
DE83011681	LBL—14790
DE83011682	LBL—15088
DE83011684	LBL—15848
DE83011685	LBL—15158
DE83011686	LBL—15140
DE83011687	LBL—15148
DE83011688	LBL—14846-Rev.
DE83011690	DOE/ET/00260—T1
DE83011691	LBL—15132
DE83011692	LBL—15137
DE83011694	CONF-830406—51
DE83011695	CONF-830406—45
DE83011700	CONF-830406—47
DE83011701	DOE/NBM—3011701
DE83011702	LBL—15234
DE83011703	LBL—15117
DE83011707	DOE/ET/10136—T2
DE83011708	CONF-830311—132
DE83011710	CONF-830469—1
DE83011711	IAEA-SM—266/24
DE83011712	CONF-830311—128
DE83011717	CONF-830469—3
DE83011718	CONF-830311—131
DE83011721	CONF-830469—2
DE83011722	CONF-830449—2
DE83011723	CONF-830446—4
DE83011724	CONF-830311—130
DE83011725	CONF-830406—42
DE83011726	CONF-830617—5
DE83011727	CONF-830550—1
DE83011729	CONF-830406—46
DE83011731	CONF-830460—2
DE83011736	DOE/LC/10916—T1
DE83011737	LBL—15607
DE83011738	NUREG/CR—2650-R4
DE83011742	LBL—15842
DE83011745	CONF-830406—48
DE83011747	CONF-830131—2
DE83011748	CONF-830439—5
DE83011751	CONF-830406—49
DE83011752	CONF-830406—50
DE83011755	CONF-830406—44
DE83011761	DOE/NE/34096—1
DE83011765	ORNL/MIT—361
DE83011766	ORNL/MIT—357
DE83011768	BNL-NCS—51647
DE83011769	BNL-NCS—51655
DE83011771	DOE/NASA/0059—1
DE83011772	UCID—19791
DE83011776	PNL—4465
DE83011777	PNL—4657
DE83011778	UCID—19749
DE83011785	UCID—18865-Vol.3
DE83011786	UCID—18865-Vol.2
DE83011787	UCID—18865-Vol.1
DE83011807	UCID—19704
DE83011808	DOE/MA—0106
DE83011809	UCID—19705
DE83011810	UCRL—53404
DE83011811	DOE/METC/SP—195
DE83011812	DOE/ER—0127/1
DE83011813	DOE/BETC—83/1
DE83011815	TENRAC/EDF—050
DE83011839	SLAC-PUB—2857
DE83011840	DOE/ER—0164
DE83011844	DOE/RL/10378—82/1
DE83011845	SAND—82-2364
DE83011846	UCRL—15527
DE83011850	DOE/EI/11550—T1
DE83011857	NUREG/CR—3217
DE83011860	SAND—82-2795C
DE83011862	COO—4142-11
DE83011863	SAND—83-0057
DE83011864	SAND—82-2172
DE83011865	UCRL—53333
DE83011868	NUREG/CR—3013
DE83011869	SAND—82-2441
DE83011871	LA—7971-MS
DE83011872	NUREG/CR—2874-Vol.3
DE83011875	UCRL—50021-81
DE83011877	GEND-INF—019-Vol.2
DE83011878	PNL—4526
DE83011879	UCID—18874-80-Vol.2
DE83011880	UCID—18874-80-Vol.1
DE83011883	GA-A—16890
DE83011884	NUREG/CR—3235-Vol.1
DE83011885	NUREG/CR—2000-Vol.2-No.4
DE83011886	UCID—18874-80-Vol.3
DE83011889	DOE/PC/50804—2
DE83011890	DOE/NV/10282—T2
DE83011891	DOE/EIA—0366
DE83011892	DOE/MC/19403—1
DE83011894	SAND—83-8214
DE83011909	DOE/PC/51252—T2
DE83011913	ANL/EES-TM—212-Vol.3
DE83011914	ANL/EES-TM—217
DE83011916	GEPP-TIS—702
DE83011918	DOE/BETC/SP—83/15
DE83011919	ANL—82-59
DE83011920	ANL—82-78
DE83011921	UCID—19673
DE83011922	SLAC—255
DE83011924	DOE/BETC/IC—83/1
DE83011925	ANL—83-21
DE83011926	ANL/FE—83-8
DE83011928	RHO-BW-ST—36P
DE83011929	DOE/NBB—0033
DE83011930	SAND—83-8213
DE83011932	ANL—82-89
DE83011933	DOE/BETC/SP—83/16
DE83011936	UCID—19793
DE83011937	SAND—83-0738
DE83011938	DOE/PE—0046
DE83011941	ONWI—314
DE83011942	ONWI—415
DE83011943	UCID—19795
DE83011946	NUREG/CR—3226
DE83011947	DOE/EIA—0383(82)
DE83011948	ANL/MCS-TM—6
DE83011950	PNL-SA—10934
DE83011952	NUREG/CR—3016
DE83011953	DOE/ID/01570—T59
DE83011954	NUS—3440-Rev.1
DE83012006	DP-MS—83-18
DE83012031	DP-MS—82-79
DE83012038	CONF-830460—1
DE83012046	UCRL—88485
DE83012047	UCRL—88486
DE83012048	UCRL—89085
DE83012049	UCRL—87650-Rev.1
DE83012059	CONF-830418—3
DE83012061	CONF-820439—7
DE83012063	CONF-830465—1
DE83012065	CONF-830464—1
DE83012069	CONF-830446—3
DE83012070	CONF-830406—38
DE83012073	BNL-NUREG—32824
DE83012074	BNL—32828
DE83012076	BNL—32651
DE83012087	DP-MS—82-53
DE83012092	UCLA-ENG—8078
DE83012093	CONF-830437—2
DE83012097	UCRL—88555
DE83012098	CONF-830419—5
DE83012099	CONF-820594—2
DE83012103	UCRL—89024
DE83012104	UCRL—88232
DE83012109	UCRL—88260
DE83012111	UCRL—88704
DE83012122	DOE/NBM—3012133
DE83012126	DP-MS—82-86
DE83012134	ORNL/CSD/TM—198
DE83012138	ORNL/TM—8618
DE83012139	ORNL/TM—8749
DE83012140	ORNL/TM—8716
DE83012141	ORNL/TM—8467
DE83012179	ANL/ES—130
DE83012187	DOE/BETC/SP—83/14
DE83012188	DOE/BETC/SP—83/17
DE83012189	DOE/PE/70019—T1
DE83012197	DOE/EI/19620—T1
DE83012200	DPSP—79-17-12
DE83012201	DPST—70-512
DE83012202	DPSP—79-17-17
DE83012204	DPSTD—82-65-Rev.1
DE83012206	DPST—81-914
DE83012209	DOE/ET/15350—2
DE83012212	BNL—32920
DE83012216	BNL—32901
DE83012226	SAND—82-2543C
DE83012227	DOE/EV/03286—22
DE83012233	DOE/ET/29147—6
DE83012241	NUREG/CR—3235-Vols.5-6
DE83012244	DOE/MC/16505—T1
DE83012245	DOE/NBM—3012245
DE83012248	NUREG/CR—2716-Vol.4
DE83012249	DOE/NBM—3012249
DE83012254	DOE/NBM—3012254
DE83012255	DOE/NBM—3012255
DE83012256	DOE/NBM—3012256
DE83012263	DOE/NBM—3012263
DE83012265	RFP—3508
DE83012266	DOE/NBM—3012266
DE83012267	DOE/NBM—3012267
DE83012268	DOE/NBM—3012268
DE83012270	BNL—51622
DE83012273	RFP—3488
DE83012274	RFP—3358
DE83012276	DOE/CS/24448—T2
DE83012294	NUREG/CR—3185
DE83012295	SAND—82-7156
DE83012296	SAND—83-0283
DE83012297	ORNL/TM—8790
DE83012298	ORNL/CON—122
DE83012299	ORNL—5949
DE83012301	UCID—19694
DE83012302	ORNL/TM—8539
DE83012305	ANL/FPP/TM—171
DE83012307	ORNL/TM—8403
DE83012318	DOE/ET/52040—T8
DE83012340	ORNL/TM—8648
DE83012343	UCRL—50051-82-3
DE83012362	SAI—254-83-438-LJ
DE83012366	DOE/PE/70225—1
DE83012372	ORNL/CON—114
DE83012380	SAND—83-0660
DE83012381	ANL/FPP/TM—173
DE83012385	DOE/OR/20837—1
DE83012403	DOE/FE/15079—T2
DE83012407	DOE/MC/08060—T1
DE83012412	NUREG/CR—2814-Vol.3
DE83012421	PPPL—1990
DE83012424	PPPL—1997
DE83012425	PPPL—1996
DE83012426	PPPL—1995
DE83012427	PPPL—1994
DE83012429	PPPL—2000
DE83012430	PPPL—1999
DE83012431	RFP—3499
DE83012432	PPPL—2007
DE83012433	PPPL—2004
DE83012435	DOE/EIA—0394-Vol.1
DE83012437	LBL—15956
DE83012438	LBL—15875
DE83012439	LBL—10593
DE83012440	LBL—15468
DE83012441	LBL—15146
DE83012442	LBL—15963
DE83012443	LBL—15907

Order No.	Report No.
DE83012445	DOE/ER/10416—T2
DE83012446	DOE/EIA—0394-Vol.3
DE83012448	NUREG/CR—2924
DE83012449	UCID—19764
DE83012454	CONF-830406—41
DE83012455	CONF-830406—40
DE83012458	NUREG/CR—3235(Vols.2-3-4)
DE83012463	ANL/CNSV-TM—113
DE83012466	ONWI—432
DE83012467	ONWI—421
DE83012468	ONWI—446
DE83012469	LBL—15463
DE83012470	LBL—15157
DE83012473	DOE/ET/12385—1
DE83012476	LBL—15874
DE83012478	LBL—15671
DE83012483	LBL—15817
DE83012489	NUREG/CR—3012-Vol.3
DE83012492	DOE/ID/12259—T1
DE83012497	NUREG/CR—3012-Vol.1
DE83012498	NUREG/CR—3012-Vol.2
DE83012521	DOE/EI/06397—T1
DE83012522	PNL—4717
DE83012524	ORNL—5940
DE83012525	ORNL—5723
DE83012526	ORNL/TM—8576
DE83012527	ORNL/TM—8714
DE83012533	ORNL—5943
DE83012565	DOE/BETC/QPR—82/4
DE83012613	DOE/ET/29297—2
DE83012707	UCID—19796
DE83012730	UCRL—53384
DE83701174	IC—80/147
DE83701175	IC—80/158
DE83701176	IC—80/181
DE83701177	IC—80/192
DE83701178	IC—81/105
DE83701179	IC—81/115
DE83701180	IC—81/120
DE83701181	IC—81/123
DE83701182	IC—81/138
DE83701183	IC—81/14
DE83701184	IC—81/22
DE83701185	IC—81/25
DE83701186	IC—81/26
DE83701187	IC—81/32
DE83701188	IC—81/40
DE83701189	IC—81/5
DE83701190	IC—81/7
DE83701191	IC—81/75
DE83701192	IC—81/79
DE83701193	IC—81/81
DE83701194	IC—81/93
DE83701195	IC—81/95
DE83701196	IC—82/60
DE83701197	IC—82/64
DE83701198	INS—427
DE83701199	INS—432
DE83701200	RRK—81-13
DE83701201	RRK—81-16
DE83701202	RRK—81-19
DE83701203	RRK—81-21
DE83701204	RRK—81-24
DE83701205	RRK—81-25
DE83701206	IPPJ—532
DE83701207	IPPJ—535
DE83701208	JAERI-M—9902
DE83701209	CBPF-NF—047/81
DE83750053	KFK—3302
DE83750054	IPP—1/206
DE83750055	GKSS—82/E/10
DE83750056	BONN-HE—82-6
DE83750058	BMFT-FB-T—82-116
DE83750059	BMFT-FB-K—82-001
DE83750060	BMFT-FB-K—82-003
DE83750061	IIUG—81-10
DE83750062	BMFT-FB-K—82-002
DE83750063	Juel-Spez—133/Bd.2
DE83750064	IPF—82-4
DE83750065	IPF—82-7
DE83750066	BMFT-FB-T—82-168
DE83750067	BMFT-FB-T—82-159
DE83750068	BMFT-FB-T—82-164
DE83750070	BMFT-FB-T—82-120
DE83750071	BMFT-FB-T—82-119
DE83750072	IPF—82-2
DE83750073	IPF—82-5
DE83750074	Juel—1785
DE83750075	Juel—1782
DE83750076	Juel—1784
DE83750077	Juel-Spez—142
DE83750078	BMFT-FB-T—82-170
DE83750079	BMFT-FB-HA—82-019
DE83750080	BMFT-FB-T—82-158
DE83750081	BMFT-FB-T—82-167
DE83750082	BMFT-FB-M—82-001
DE83750083	BMFT-FB-K—82-008
DE83750084	BMFT-FB-K—82-007
DE83750085	BMFT-FB-T—82-155
DE83750086	BMFT-FB-T—82-171
DE83750087	BMFT-FB-T—82-160
DE83750088	BMFT-FB-T—82-152
DE83750089	BMFT-FB-T—82-157
DE83750090	BMFT-FB-T—82-156
DE83750091	BMFT-FB-T—82-153
DE83750092	BMFT-FB-T—82-161
DE83750093	BMFT-FB-T—82-151-Vol.2
DE83750094	BMFT-FB-T—82-151-Vol.1
DE83750095	IKE-K—69
DE83750096	Juel-Spez—134
DE83750097	PTB-FMRB—89
DE83750098	BMFT-FB-K—82-004
DE83750099	BMFT-FB-K—82-006
DE83750100	BMFT-FB-K—82-005
DE83750101	Juel-Spez—154
DE83750102	Juel—1752
DE83750103	KFK—3295
DE83750104	GSF-R—268
DE83750105	BONN-HE—82-9
DE83750106	BONN-HE—82-11
DE83750107	BONN-HE—82-12
DE83750108	BONN-HE—82-7
DE83750109	KFK—3306
DE83750110	KFK—3297
DE83750111	KFK—3347
DE83750113	BMFT-FB-T—82-162
DE83750114	BMFT-FB-HA—82-018
DE83750115	BMFT-FB-T—82-169
DE83750376	KFK-CAD—202
DE83750377	Juel-Spez—155
DE83750378	DFVLR-MITT—82-09
DE83750392	KFK—3412
DE83750446	NP—3750446
DE83750447	NP—3750447
DE83750454	SV-FUD—1-7
DE83750455	STU—78-4160
DE83750456	SNV-PM—1494
DE83750457	LUTKDH/TKMB—1002/150(1981)
DE83750458	NP—3750458
DE83750459	DFE—47
DE83750460	NE-BF—81-6
DE83750461	NE-SBT—81-38
DE83750462	NE-SBT—82-11
DE83750463	LUTFD2/TFKF—3021/1-120/79
DE83750464	DFE—48
DE83750465	TRITA-KUT—1025
DE83750466	CONF-8109216—Vol.1
DE83750467	NP—3750467
DE83750468	NE-TEKNIK—82-5b
DE83750469	CBI-F—2-81
DE83750470	KHM-TR—21
DE83750471	KHM-TR—17
DE83750472	KHM-TR—16
DE83750473	SVF—125
DE83750474	STUDSVIK-EB—82-15
DE83750475	DFE—49
DE83750476	DFE—42
DE83750477	NP—3750477
DE83750478	NE/FBA—81-4
DE83750479	NE-VIND—81-7
DE83750480	NE-TEKNIK—82-1
DE83750481	NP—3750481
DE83750482	NP—3750482
DE83750483	CONF-8105214—
DE83750484	NP—3750484
DE83750485	NE-BF—81-2
DE83750486	NE-BF—82-8
DE83750487	SMAB—9
DE83750488	STUDSVIK-ET—81-160
DE83750489	USIP—82-02
DE83750490	NE-VIND—81-26
DE83750491	IVL-B—588
DE83750493	UPTEC—8078-E
DE83750494	UPTEC—8077-E
DE83750495	UPTEC—80121-E
DE83750496	UUIM—66
DE83750497	NE-TEKNIK—81-1
DE83750498	NE-VIND—82-4
DE83750499	CTH-JVG—5
DE83750500	NE-VIND—81-28
DE83750501	NE-TFS—81-1
DE83750502	NE-TEKNIK—81-3
DE83750503	NE-VIND—82-21
DE83750504	NE-VIND—82-22
DE83750505	NE-SBT—81-20
DE83750506	NE/TORV—81-4
DE83750507	NE-VIND—82-25
DE83750508	NE-VIND—82-18
DE83750509	NE-VIND—82-19
DE83750511	NE-VIND—82-20
DE83750512	NE-TEKNIK—81-2
DE83750513	NE-VIND—82-26
DE83750514	KHM-TR—22
DE83750515	NE-TEKNIK—81-6
DE83750516	IVL-B—668
DE83750517	NE-SBT—81-17
DE83750518	STU—79-3419
DE83750519	IVL-B—679
DE83750520	IVL-B—678
DE83750521	DFE—50
DE83750522	NE-EO—81-15
DE83750523	NE-SBT—82-3
DE83750524	NE-SBT—82-1
DE83750525	NE-EO—82-4
DE83750526	NE-EO—81-14
DE83750527	NE-SBT—81-25
DE83750528	NE-SBT—81-19
DE83750530	NE-EO—82-5
DE83750531	NE-EO—82-2
DE83750532	SOL—1982-6
DE83750533	SV-SOL—1982-5
DE83750534	SV-SOL—1982-4
DE83750535	SV-SOL—1982-3
DE83750536	SV-SOL—1982-1
DE83750537	NE-SBT—82-18
DE83750538	NE-SBT—81-42
DE83750539	NE-VIND—82-16
DE83750540	NP—3750540
DE83750541	NE-TEKNIK—81-11
DE83750542	SLU-ISS—2-1980
DE83750543	NE-SBT—82-16
DE83750544	DFE—46
DE83750545	JTI—38
DE83750546	NE-SBT—81-9
DE83750547	NE-SBT—81-7
DE83750548	STF—88-A81033
DE83750549	STF—88-A81017
DE83750550	SCP-R—2-64-25
DE83750551	SCP-R—2-64-28
DE83750552	NSFI-OR—221-21281-53-04
DE83750553	NSFI-R—97-80
DE83750855	DFVLR-FB—82-25
DE83750856	BMFT-FB-T—83-011
DE83750857	BMFT-FB-T—83-001
DE83750858	BMFT-FB-T—83-008
DE83750859	BMFT-FB-T—83-010
DE83750860	BMFT-FB-T—83-002
DE83750861	BMFT-FB-T—83-016
DE83750862	BMFT-FB-T—83-013
DE83750864	Juel—1813
DE83750865	BMFT-FB-T—83-003
DE83750866	BMFT-FB-T—83-009
DE83750867	BMFT-FB-T—83-036
DE83750868	BMFT-FB-T—83-020
DE83750869	BMFT-FB-T—83-025
DE83750870	BMFT-FB-T—83-027
DE83750896	Juel-Spez—166
DE83750897	Juel-Spez—186
DE83750899	IFU-B—22-82
DE83770046	CONF-8002104—1
DE83770047	NP—3770047
DE83770048	NP—3770048

Order No.	Report No.
DE83770049	NP—3770049
DE83770050	NP—3770050
DE83770051	NP—3770051
DE83770052	NP—3770052
DE83770053	NP—3770053
DE83770055	NP—3770055
DE83770056	NP—3770056
DE83770057	NP—3770057
DE83770058	NP—3770058
DE83770059	NP—3770059
DE83770060	NP—3770060
DE83770061	NP—3770061
DE83770062	NP—3770062
DE83770063	NP—3770063
DE83770064	NP—3770064
DE83770065	NP—3770065
DE83770066	NP—3770066
DE83770067	NP—3770067
DE83770068	NP—3770068
DE83770069	NP—3770069
DE83770089	NP—3770089
DE83770091	NP—3770091
DE83770092	NP—3770092
DE83770093	NP—3770093
DE83770094	NP—3770094
DE83770095	NP—3770095
DE83770096	NP—3770096
DE83770097	NP—3770097
DE83770098	NP—3770098
DE83770099	NP—3770099
DE83770100	NP—3770100
DE83770101	NP—3770101
DE83770102	NP—3770102
DE83770103	NP—3770103
DE83770104	NP—3770104
DE83770105	NP—3770105
DE83770106	NP—3770106
DE83770107	NP—3770107
DE83770108	NP—3770108
DE83770109	NP—3770109
DE83770110	NP—3770110
DE83770111	NP—3770111
DE83770112	NP—3770112
DE83770113	NP—3770113
DE83770114	NP—3770114
DE83770115	NP—3770115
DE83770116	NP—3770116
DE83780405	INIS-mf—7355
DE83780406	INIS-mf—7484
DE83780408	INIS-mf—7481
DE83780409	INIS-mf—7502
DE83780410	INIS-mf—7492
DE83780432	INIS-mf—7475-Vol.A
DE83780441	INIS-mf—7545
DE83780450	INIS-mf—7413
DE83780451	INIS-mf—7425
DE83780452	INIS-mf—7439
DE83780453	INIS-mf—7451
DE83780454	INIS-mf—7473
DE83780455	INIS-mf—7133
DE83780456	INIS-mf—7420
DE83780457	INIS-mf—7426
DE83780458	INIS-mf—7427
DE83780459	INIS-mf—7428
DE83780460	INIS-mf—7429
DE83780461	INIS-mf—7430
DE83780462	INIS-mf—7435
DE83780463	INIS-mf—7448
DE83780464	INIS-mf—7450
DE83780465	INIS-mf—7412
DE83780466	INIS-mf—7414
DE83780467	INIS-mf—7447
DE83780468	INIS-mf—7417
DE83780469	INIS-mf—7442
DE83780470	INIS-mf—7445
DE83780471	INIS-mf—7443
DE83780472	INIS-mf—7440
DE83780473	INIS-mf—7462
DE83780474	INIS-mf—7468
DE83780475	INIS-mf—7421
DE83780476	INIS-mf—7422
DE83780477	INIS-mf—7455
DE83780478	INIS-mf—7458
DE83780479	INIS-mf—7459
DE83780480	INIS-mf—7469
DE83780481	INIS-mf—7399
DE83780482	INIS-mf—7416
DE83780483	INIS-mf—7467
DE83780484	KFTI—81-49
DE83780485	RL—82-075
DE83780486	INIS-mf—7626(Vol.3)
DE83780487	INIS-SU—144
DE83780488	INIS-mf—7675
DE83780489	INIS-mf—7626(Vol.1)
DE83780490	INIS-mf—7626(Vol.2)
DE83780492	INIS-mf—7678
DE83780503	INIS-mf—7685
DE83780517	INIS-mf—7605
DE83780520	INIS-SU—152
DE83780521	INIS-SU—157
DE83780523	INIS-SU—158
DE83780524	INIS-mf—7751
DE83780620	KFK-PTWT—1
DE83901709	NUREG—0968-Suppl.1
DE83901722	NUREG—0580-Vol.12-No.4
DE83901737	NUREG—0936-Vol.2-No.1
DE83901739	CE-TR—7892
DE83901744	NUREG—0728-Rev.1
DE83901749	NUREG/CR—3173
DE83901756	NUREG—0896-Suppl.1
DE83901757	NUREG—0954-Suppl.1
DE83901782	CONF-820730—Summ.
DE83901791	NUREG—1000-Vol.1
DE83901922	EPRI-EL—2943-CCM
DE83901965	EPRI-CS—2897-Vol.1
DE83901978	EPRI-NP—2966
DE83902017	NUREG/CR—3230
DE83902022	NUREG—0987
DE83902052	NUREG/CR—3228-Vol.1
DE83902084	NUREG/CR—3207
DE83902085	NUREG—0892-Suppl.No.3
DE83902086	TENRAC/ADM—80-001
DE83902112	NUREG—0941
DE83902119	NUREG—0999
DE83902161	NUREG/CR—2568

Abbreviations Used in Availability Column

EM Available in aperture card format only. Inquiries regarding the availability of these items should be addressed to USDOE-TIC, P.O. Box 62, Oak Ridge, Tennessee, 37830.

ETEC Available *only to requesters within the United States* from the Energy Technology Engineering Center, P.O. Box 1449, Canoga Park, California 91304.

GJO Available from DOE Grand Junction Office, P.O. Box 2567, Grand Junction, Colorado 81501.

GPO For sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

HMSO Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London, England, EC1P 1BN.

NSO Available *only to requesters within the United States* from the Nuclear Standards Office, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37830.

NTIS For sale by the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, Virginia 22161. Price given is the domestic price for paper copy; prices for foreign purchasers are in most instances twice the domestic price.

TIC Available from the Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

NTIS NORTH AMERICAN PRICE CODES

Most NTIS products and services are now announced by price codes and, therefore, without specific prices in NTIS journals, newsletters and indexes.

The current dollar equivalent for each code is shown in the schedule below. Orders must list the accession number(s) and be accompanied by the total dollar amount from the current schedule.

NORTH AMERICAN CONTINENT PRICE SCHEDULE

Customers in Canada, United States, and Mexico please use this price schedule; other addressees, write for Folder PR-360-4.

MICROFICHE			
A01	$4.50	E01	$6.50
PAPER COPY		E02	7.50
		E03	9.50
A02	7.00	E04	11.50
A03	8.50	E05	13.50
A04	10.00	E06	15.50
A05	11.50	E07	17.50
A06	13.00	E08	19.50
A07	14.50	E09	21.50
A08	16.00	E10	23.50
A09	17.50	E11	25.50
A10	19.00	E12	28.50
A11	20.50	E13	31.50
A12	22.00	E14	34.50
A13	23.50	E15	37.50
A14	25.00	E16	40.50
A15	26.50	E17	43.50
A16	28.00	E18	46.50
A17	29.50	E19	51.50
A18	31.00	E20	61.50
A19	32.50	E99	**
A20	34.00		
A21	35.50	N01	35.00
A22	37.00	N02	40.00
A23	38.50		
A24	40.00		
A25	41.50		
A99	*		

T01	$125.00
T02	140.00
T03	240.00
T04	320.00
T05	400.00
T06	465.00
T07	530.00
T08	595.00
T09	660.00
T10	725.00
T11	790.00
T12	855.00
T13	920.00
T14	985.00
T15	1,050.00
T16	1,115.00
T17	1,180.00
T18	1,245.00
T19	1,310.00
T99	**

*Add $1.50 for each additional 25-page increment, or portion thereof.
**Contact NTIS for price quote.

PRICES EFFECTIVE JANUARY 1, 1983

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

CODES USED ON INDEX LINES

Following the citation numbers in the Corporate Author, Personal Author, and Subject Indexes, codes are used to designate the type of document, country of publication, and language of the document, e.g., (R:SU: In Russian). The language designator does not appear if the document is published in English.

DOCUMENT TYPES

J Journal article
TJ Translation of a journal article
R Report
RA Report analytic
B Book
BA Book analytic
P Patent
E Engineering materials
D Thesis or dissertation
TG Translation (general)
TA Translation (analytic)

COUNTRY CODES

AD Andorra
AE United Arab Emirates
AF Afghanistan
AL Albania
AR Argentina
AT Austria
AU Australia

BB Barbados
BD Bangladesh
BE Belgium
BG Bulgaria
BH Bahrain
BI Burundi
BM Bermuda
BO Bolivia
BR Brazil
BS Bahamas
BT Bhutan
BU Burma
BW Botswana
BY Byelorussian Soviet Socialist Republic (Byelorussian SSR)

CA Canada
CB Khmer Republic
CE Ceylon
CF Central African Republic
CG Congo
CH Switzerland
CI Ivory Coast
CL Chile
CM United Republic of Cameroon
CN China
CO Columbia
CR Costa Rica
CS Czechoslovakia
CU Cuba
CY Cyprus

DD German Democratic Republic
DE Germany, Federal Republic of (F.R. Germany)
DK Denmark
DO Dominican Republic
DY Dahomey
DZ Algeria

EA European American Committee Reactor Physics
EC Ecuador
ED European American Nuclear Data Committee
EG Egypt
ER European Space Research Organization
ES Spain
ET Ethiopia
EU European Company for the Chemical Processing of Irradiated Fuels

FI Finland
FJ Fiji
FR France

GA Gabon
GB United Kingdom of Great Britain and Northern Ireland (UK)
GD Grenada
GH Ghana
GM Gambia
GN Guinea
GQ Equatorial Guinea
GR Greece
GT Guatemala
GW Guinea-Bissau
GY Guyana

HK Hong Kong
HN Honduras
HT Haiti
HU Hungary
HV Upper Volta

IA Inter-American Nuclear Energy Commission
IB International Bank for Reconstruction and Development
ID Indonesia
IE Ireland
IG Inter-Governmental Maritime Consultative Organization
II International Commission on Radiation Units and Measurements
IL Israel

IN India
IO International Labor Organization
IP International Union of Pure and Applied Physics
IQ Iraq
IR Iran
IS Iceland
IT Italy
IX International Union of Pure and Applied Chemistry

JM Jamaica
JO Jordan
JP Japan

KE Kenya
KH Cambodia
KP Democratic People's Republic of Korea
KR Korea, Republic of
KW Kuwait

LA Laos
LB Lebanon
LI Liechtenstein
LK Sri Lanka
LR Liberia
LS Lesotho
LU Luxembourg
LY Libyan Arab Republic

MA Morocco
MC Monaco
MG Madagascar
ML Mali
MN Mongolia
MR Mauritania
MT Malta
MU Mauritius
MV Maldives
MW Malawi
MX Mexico
MY Malaysia

NE Niger
NG Nigeria
NI Nicaragua
NL Netherlands
NO Norway
NP Nepal
NR Nauru
NZ New Zealand

OE Organization for Economic Cooperation and Development
OM Oman

PA Panama
PE Peru
PG Papua New Guinea
PH Philippines
PK Pakistan
PL Poland
PR Puerto Rico
PT Portugal
PY Paraguay

QA Qatar

RH Southern Rhodesia
RO Romania
RW Rwanda

SA Saudi Arabia
SD Sudan
SE Sweden
SG Singapore
SK Sikkim
SL Sierra Leone
SM San Marino
SN Senegal
SO Somalia
SU Union of Soviet Socialist Republics (USSR)
SV El Salvador
SY Syria
SZ Swaziland

TC Trucial Oman
TD Chad
TG Togo
TH Thailand
TN Tunisia
TO Tonga
TR Turkey
TT Trinidad and Tobago
TW Taiwan
TZ United Republic of Tanzania

UA Ukrainian Soviet Socialist Republic (Ukrainian SSR)
UE United Nations Educational, Scientific and Cultural Organization
UF United Nations Children's Fund
UG Uganda
UI United Nations Industrial Development Organization
US United States of America (USA)
UY Uruguay

VA Holy See
VD Democratic Republic of Viet-Nam
VE Venezuela
VS Republic of Viet-Nam

WM World Meteorological Organization
WS Western Samoa

XA International Atomic Energy Agency (IAEA)
XC European Organization for Nuclear Research (CERN)
XE Commission of the European Communities (CEC)
XF Food and Agriculture Organization of the United Nations (FAO)
XJ Joint Institute for Nuclear Research (JINR)
XM Council for Mutual Economic Assistance (CMEA)
XN Nuclear Energy Agency of the OECD (NEA)
XO Organization of African Unity (OAU)
XR International Commission on Radiological Protection (ICRP)
XS International Organization for Standardization (ISO)
XU United Nations (UN)
XW World Health Organization (WHO)
XX World Energy Conference (WEC)

YD Democratic Yemen
YE Yemen
YU Yugoslavia

ZA South Africa
ZM Zambia
ZR Zaire

* U.S. GOVERNMENT PRINTING OFFICE: 1983-646-052:5

Cut out appropriate form and mail in a stamped envelope to the address indicated.

Change of Address Form

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

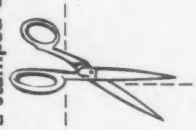
PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to:

NEW ADDRESS
Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.



Subscription Order Form

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

ENGINEERING MATERIALS: A BIBLIOGRAPHY

ABOUT ENGINEERING MATERIALS: A BIBLIOGRAPHY
DOE/TIC-4628

Published by the
Technical Information Center
U.S. Department of Energy

1982

59 pages, 8½ by 11 in.
paper binding

The Engineering Materials Program, developed by the Department of Energy and its predecessor agencies through the Technical Information Center, makes available to the public such informational tools as drawings, specifications, design criteria, flow sheets, parts lists, bills of materials, photographs, and maps which are associated with equipment, instruments, processes, and facilities developed or investigated by agency contractors. These materials are grouped by sets, or packages, and each package is identified by a CAPE (Civilian Application Program—Engineering) number. A package may consist of information on many different but associated materials.

Engineering Materials: A Bibliography provides abstracting and indexing coverage of the 322 engineering materials packages that are included in the Department of Energy's Energy Data Base. The CAPE packages in this bibliography (DOE/TIC-4628) are arranged by the following categories: Coal and Coal Products; Nuclear Fuels; Isotope and Radiation Source Technology; Solar Energy; Wind Energy; Electric Power Engineering; Nuclear Reactor Technology; Energy Storage; Energy Conservation, Consumption, and Utilization; Materials; Chemistry; Engineering; Particle Accelerators; Instrumentation; Physics; Fusion Energy; and General and Miscellaneous. Corporate author, subject, and report number indexes are provided.

A forthcoming bibliography will announce more than 2400 other CAPE packages which were issued prior to 1975 but which are not included in the data base.

Available as Order No. DE82014444 (Report No. DOE/TIC-4628) for $10.00 from:

National Technical Information Service
U.S. Department of Commerce
Springfield, VA 22161

AVAILABILITY OF REFERENCES ABSTRACTED

REPORTS

Most reports abstracted in this publication may be obtained from

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161

or

DOE Technical Information Center (TIC)
P. O. Box 62
Oak Ridge, TN 37830
ATTN: Customer Services Division

Note: DOE offices and contractors should order from TIC; all others should order from NTIS. For more specific information on ordering, please note the introductory paragraph to the Report Number Index. For assistance in obtaining reports that do not have an Order No. (DE...) or other availability indicated in the citation or Report Number Index, contact TIC.

PATENTS

Although not cataloged as reports, patents cited from each country are listed in the Report Number Index under PATENTS-AU, PATENTS-FR, PATENTS-US, etc. U. S. Patent Applications, e.g., A 293,415, are available from NTIS.

NON-REPORT DOCUMENTS

Check the citation closely for the availability of such documents as journal articles, conference papers, books, and monographs. It may be necessary to request directly from the publisher or originator or to contact local, state, or university libraries or commercial reprint services.

Dissertations are available from University Microfilms International, Dissertation Copies, P. O. Box 1764, Ann Arbor, MI. Please request by Order No., e.g., DA82-11997.

OTHER

When GPO is cited as available source, order from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

REPORT COLLECTIONS

The libraries listed below purchase and maintain microfiche collections of DOE and foreign reports. Most of these libraries have microfiche reader-printers or other photocopy facilities with which to reproduce enlarged copies from microfiche. Charges for reproduction services vary.

United States

ARIZONA
Tucson, University of Arizona

CALIFORNIA
Davis, University of California
Los Angeles, University of California
Santa Barbara, University of California

COLORADO
Boulder, University of Colorado

DISTRICT OF COLUMBIA
Washington, Library of Congress

FLORIDA
Gainesville, University of Florida

GEORGIA
Atlanta, Georgia Institute of Technology

ILLINOIS
Urbana, University of Illinois

INDIANA
Lafayette, Purdue University

KANSAS
Manhattan, Kansas State University

KENTUCKY
Lexington, University of Kentucky

LOUISIANA
Baton Rouge, Louisiana State University

MARYLAND
College Park, University of Maryland

MASSACHUSETTS
Cambridge, Massachusetts Institute of Technology

MISSISSIPPI
Mississippi State, Mississippi State University

MISSOURI
Columbia, University of Missouri
Kansas City, Linda Hall Library

NEBRASKA
Lincoln, University of Nebraska

NEW JERSEY
Princeton, Princeton University

NEW MEXICO
Albuquerque, University of New Mexico

NEW YORK
Albany, New York State Library
Ithaca, Cornell University
New York, Columbia University
Rochester, University of Rochester

NORTH CAROLINA
Raleigh, North Carolina State University

OHIO
Cincinnati, University of Cincinnati
Cleveland, Cleveland Public Library

OKLAHOMA
Norman, University of Oklahoma

PUERTO RICO
San Juan, University of Puerto Rico

SOUTH CAROLINA
Columbia, University of South Carolina

TEXAS
Austin, University of Texas
College Station, Texas A & M University
Houston, Rice University

UTAH
Salt Lake City, University of Utah

WASHINGTON
Pullman, Washington State University
Seattle, University of Washington

WISCONSIN
Madison, University of Wisconsin

International

EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)
Brussels, Belgium
Ispra, Varese, Italy, Cetis Library

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)
Vienna, Austria

OECD NUCLEAR ENERGY AGENCY (NEA)
British Library Lending Division
Boston Spa, Wetherby, Yorkshire, England

DOE/RECON SYSTEM

COMPUTER SEARCH SERVICE

DOE/RECON is an interactive on-line information retrieval system developed to provide rapid and easy access to energy-related data bases. The acronym RECON stands for REmote CONsole, which signifies that the system can be accessed by users located at various sites across the United States.

The system permits users to carry on a dialogue with the computer. This dialogue allows browsing through large data bases and can result in retrieval of citations which answer specific needs. Desired information can be selectively retrieved via simple yet powerful commands sent to the computer from the terminal keyboard.

Search logic may be formulated by the use of indexed terms, such as keywords, authors, categories, or corporate authors. As the search session progresses, AND, OR and NOT Boolean logic may be used to improve precision, i.e., the specificity of the retrieved set. For most data bases, the user may limit the scope of the search to particular years or volumes of data. Upon completion of a search, the user may choose to have the results displayed or printed at his/her terminal or to have the results printed and mailed the following day.

The DOE/RECON system is supported by dual IBM 370/3033 computers. Two IBM 3705 front-end communications computers are used to perform the message switching. Although most of the 40 data bases are bibliographic in content, DOE/RECON is not limited to this type; the Research in Progress (RIP) data base is one that is non-bibliographic. Presently, over 2 million references are available.

Requests for information concerning authorization to access the DOE/RECON system should be addressed to:

Thomas D. Sample
Technical Information Center
U. S. Department of Energy
P. O. Box 62
Oak Ridge, TN 37830